Leica GR10/GR25
User Manual

Leica SPIDER

Version 2.5
English

- when it has to be **right**

Leica Geosystems

Introduction

Purchase Congratulations on the purchase of a Leica GR10/GR25.

This manual contains important safety directions as well as instructions for setting up the product and operating it. Refer to "8 Safety Directions" for further information.
Read carefully through the User Manual before you switch on the product.

Product identification The type and serial number of your product are indicated on the type plate. Enter the type and serial number in your manual and always refer to this information when you need to contact your agency or Leica Geosystems authorised service workshop.

Type: _____

Serial No.: _____

Symbols The symbols used in this manual have the following meanings:

Type	Description
⚠ **DANGER**	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ **WARNING**	Indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.
⚠ **CAUTION**	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in appreciable material, financial and environmental damage.
☞	Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

Trademarks
- Windows is a registered trademark of Microsoft Corporation in the United States and other countries
- SD is a trademark of the SD Card Association

All other trademarks are the property of their respective owners.

Validity of this manual This manual applies to the GR10/GR25.

Available documentation

Name	Description/Format	📖	📄
GR10/GR25 User Manual	All instructions required in order to operate the product to a basic level are contained in the User Manual. Provides an overview of the product together with technical data and safety directions.	✓	✓

Name	Description/Format		
GR Series Operational Manual (Online Help)	Comprehensive guide to the product and the operation. Includes a description of the hardware installation and common accessories. Software setup is described in detail, along with the technical specifications. The complete manual can be viewed online via the GR Series Web interface.		✓
GNSS Reference Station and Networks - An Introductory Guide	Offers practical advice on how to set up and run individual GNSS reference stations and networks of stations and to provide the services that are required.	✓	✓
GNSS Networks and Reference Stations Equipment List	Detailed list of equipment available for GNSS reference stations including hardware and software.		✓

Refer to the following resources for all GR10/GR25 documentation/software:
• the Leica GR Series DVD
• https://myworld.leica-geosystems.com

myworld
@Leica Geosystems

myWorld@Leica Geosystems (**https://myworld.leica-geosystems.com**) offers a wide range of services, information and training material. With direct access to myWorld, you are able to access all relevant services whenever it is convenient for you, 24 hours a day, 7 days per week. This increases your efficiency and keeps you and your equipment instantly updated with the latest information from Leica Geosystems.

Service	Description
myProducts	Simply add all Leica Geosystems products that you and your company own. View detailed information on your products, buy additional options or Customer Care Packages (CCPs), update your products with the latest software and keep up-to-date with the latest documentation.
myService	View the service history of your products in Leica Geosystems Service Centers and detailed information on the services performed on your products. For your products that are currently in Leica Geosystems Service Centers view the current service status and the expected end date of service.
mySupport	Create new support requests for your products that will be answered by your local Leica Geosystems Support Team. View the complete history of your Support and view detailed information on each request in case you want to refer to previous support requests.
myTraining	Enhance your product knowledge with the Leica Geosystems Campus - Information, Knowledge, Training. Study the latest online training material or download training material on your products. Keep up-to-date with the latest News on your products and register for Seminars or Courses in your country.

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1 Description of the System

1.1 General Information

Design

The instrument
- is designed for various permanent and semi-permanent reference station applications, including network RTK, single base station, scientific, campaign, monitoring and seismic studies.
- collects, stores and disseminates GNSS data.
- is highly suited to system integration.
- supports various external devices including communication, meteo and tilt.

Satellite tracking

The instrument can track
- GPS L1/L2 (including L2C)/L5
- GLONASS L1/L2 (including L2C)
- Galileo E1/E5a/E5b/AltBOC
- SBAS

☞ Once the first operational Galileo satellites are available, a software update will be required.

☞ The instrument is designed to support Compass. The Compass signal definition is not fully finalised, although, test signals have been tracked in a test environment. As changes may still occur, Leica Geosystems cannot guarantee full Compass compatibility.

Special features GR10/GR25

The instruments are equipped with several special features:
- 50 Hz data logging and streaming.
- SmartTrack+ measurement engine for higher accuracy and availability.
- Up to 10 multiple logging sessions and 20 data streams.
- Multiple data storage formats including MDB, RINEX and Hatanaka.
- Supports high capacity storage up to 32 GB and intelligent Smart clean-up.
- Multiple data output formats including Leica, Leica 4G, RTCM 2.x,3.x, LB2, BINEX, CMR, CMR+.
- Modern, user friendly Web interface GUI, available in different languages.
- Seamless integration with Leica GNSS Spider.
- Robust lightweight metal housing.
- Fully ruggedised to IP67, including a ruggedised Ethernet port.
- Simple mounting for IT rack, cabinet and wall mount. Unit is also stackable.
- Built in communications Slot-in port.
- Integrated device management for external devices.
- Supports DHCP, DNS, DynDNS and mobile internet.
- NTRIP Server/Client/Caster
- Improved security including IP filtering, access management and HTTPS with custom SSL.
- Out of the box plug and play hostname setup.
- Wide supply voltage 10.5-28 V.
- Low-power consumption, with 3.0-3.5 W typical.
- External oscillator port
- USB client port

Special features GR25 only

In addition, the GR25 instruments are equipped with several special features:
- Integrated display and keypad.
- Internal battery and charger.
- USB host port.
- Power over Ethernet.
- Bluetooth.
- PPS and event port.

1.2　GNSS Reference Station Components

Component overview

The following diagram shows a variety of reference station setups and the most common accessories that can be used with a GR10/GR25.
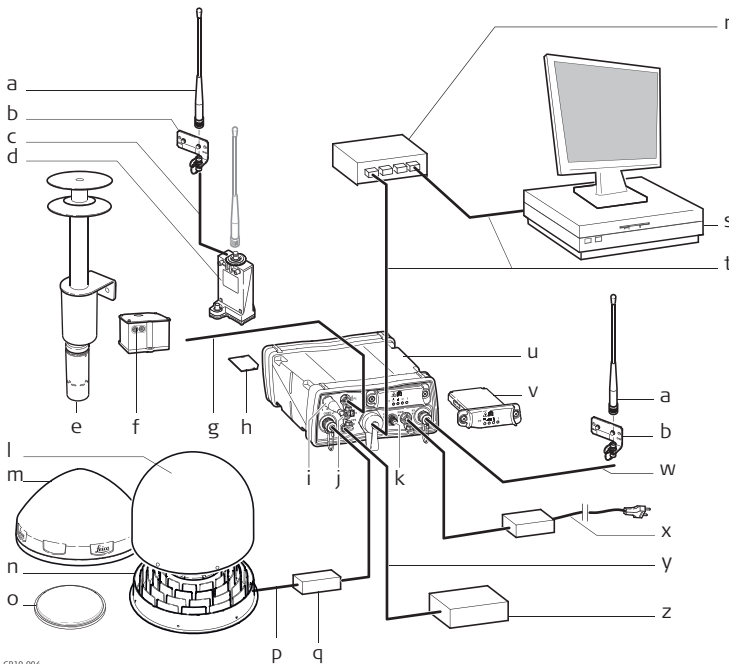
GR10_004

a) Radio/GSM antenna
b) Antenna bracket
c) Antenna cable
d) GFU housing incl. Radio/GSM device
e) Meteo sensor
f) Tilt sensor
g) Serial cable
h) SD card
i) Bluetooth antenna*
j) Serial port 2/Event port*
k) Connector for external oscillator
l) Optional radome for AR25
m) GNSS antenna, AR10
n) GNSS antenna, AR25

o) GNSS antenna, AS10
p) Antenna cable
q) Optional lightning protection
r) Ethernet hub
s) Computer running GNSS Spider or web interface
t) Ethernet cable
u) GR10/GR25
v) Slot-in radio/GSM device
w) Antenna cable
x) Power supply
y) PPS cable*
z) Device receiving electric pulse*

* GR25 only

Minimum setup components

The following diagram shows the minimum components required to operate a GR10/GR25.

GR10_021
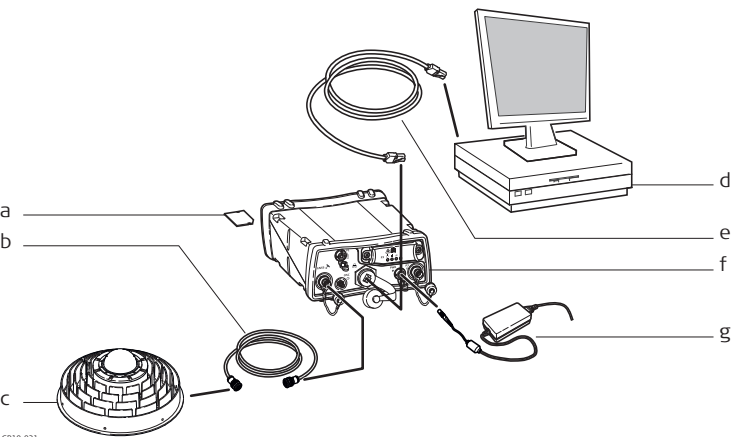
a) SD card[*]
b) Antenna cable
c) GNSS Antenna
d) Computer running Web interface or Leica GNSS Spider
e) Ethernet or USB cable
f) GR10/GR25
g) Power supply

* The instrument can be operated without the SD card but only data streaming will be possible.

Main components

Component	Description
GR10/GR25	To provide the storage and streaming of raw satellite data.
Antenna	To receive the satellite signals from the GNSS (Global Navigation Satellite System) satellites
Web interface	Web-based tool to configure the GR Series instrument. ☞ The GR25 features a display and buttons which can be used for intial instrument setup or minor configuration changes in the field.
Leica GNSS Spider	The reference station office software including comprehensive instrument control and configuration, file download and firmware upload functions which support working with Leica GR Series instruments. Supports the connection to single or multiple reference instruments simultaneously.

1.3 Unpacking the Instrument

Delivery box

The minimum items delivered with the GR10/GR25 include:

GR10_022
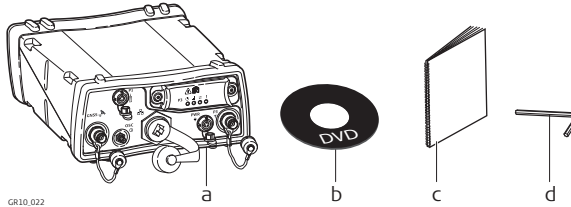
a) GR10/GR25
b) DVD
c) GR10/GR25 User Manual
d) Allen key (GR25 only)

Accessories

Additional equipment such as cables, antennas and power supply required for a complete reference station installation are delivered with the GR10/GR25 when ordered. For an overview of a typical reference station installation and the accessories that can be used with the instrument go to "Component overview".

For further information on accessories, please refer to the "GR Series Operational Manual (Online Help)".

1.4 Instrument Components

GR10 components
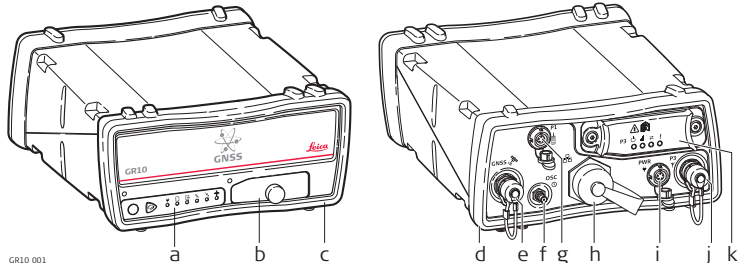
GR10_001

a) User interface
b) USB and SD card cover
c) Front rubber bumper
d) Back rubber bumper
e) GNSS Antenna port
f) External Oscillator port
g) Serial port (P1)
h) Ruggedised Ethernet port
i) Power port
j) Communication Slot-in port Antenna (P3)
k) Communication Slot-in port (P3)

GR25 components
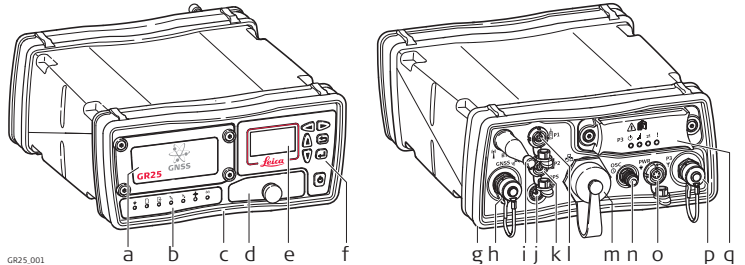
GR25_001

a) Battery cover
b) LED's
c) Front rubber bumper
d) USB and SD card cover
e) Display
f) Buttons
g) Back rubber bumper
h) GNSS Antenna port
i) Bluetooth Antenna
j) PPS port
k) Serial and Event in port (P2)
l) Serial port (P1)
m) Ruggedised Ethernet port
n) External oscillator port
o) Power port
p) Communication Slot-in port Antenna (P3)
q) Communication Slot-in port (P3)

1.5   Operation

Overview   The GR Series instrument can be operated by:
- pressing its buttons
- the display (GR25 only)
- the Web interface
- Leica GNSS Spider software
- or with the Leica Binary 2 (LB2) interface. Contact your Leica Geosystems representative for information on LB2 documentation.

☞ The instrument is delivered with default settings which cover the needs of the typical user. Use the Web interface or Leica GNSS Spider to adjust the instrument settings.

Operation by Web interface   The Web interface is the main component used to configure and operate the instrument.
Refer to the "GR Series Operational Manual (Online Help)" for a detailed description of the Web Interface.

Supported operating systems for Web interface setup over USB
- Windows XP SP2 and SP3 (32 bit)
- Windows Vista SP2 (32 bit)
- Windows Server 2008 SP1 (64 bit)
- Windows 7 (32 bit and 64 bit)

Supported web browsers for the Web interface

Web browser	Supported version
Internet Explorer	7 and higher
Firefox	3.5 and higher
Opera	10 and higher
Safari	4 and higher
Google Chrome	7 and higher

☞ The Web interface is the primary interface between the user and the instrument. To use the Web interface correctly make sure the web browser allows JavaScript to be run. Check the web browsers settings if you have problems using the Web interface.

Web interface security   When accessing the Web interface for the first time use the default **User name** (Admin) and **Password** (12345678).

☞ For security reasons, it is recommended to create a new administrator account when logging in for the first time. After creating the new administrator, log out and relogin with the new user credentials. The default user account can then be deleted. Refer to the "GR Series Operational Manual (Online Help)" for a step-by-step guide.

Operation by Leica GNSS Spider

The reference station software Leica GNSS Spider provides comprehensive instrument functionality, like the Web interface.

☞ Some configuration settings are available both in the Web interface and in Leica GNSS Spider. If such settings are configured in the Web interface, and then an **Upload Settings** or **Start** is done from Leica GNSS Spider, the settings are overwritten. In this case use the Web interface exclusively for settings that are not available in Leica GNSS Spider.

To operate Leica GNSS Spider, refer to the
* "GR Series Operational Manual (Online Help)" for basic information.
* "Leica GNSS Spider Online Help" for advanced information.

Requirement
* GR10: Leica GNSS Spider v4.0 or later must be installed.
* GR25: Leica GNSS Spider v4.2 or later must be installed.

☞ The version requirement applies to active instrument connections to configure the instrument by Leica GNSS Spider. It does not apply to passive connections for data streaming only.

GNSS Spider features

GNSS Spider features:
* Simultaneous configuration and communication with one or many instruments.
* Monitoring and messaging on instrument key parameters such as power voltage level, data storage availability, instruments internal temperature or events logged on the instrument.
* Visualisation of satellite tracking status.
* Transfer of raw data automatically from the instrument to a central data storage.
* Perform RINEX conversion manually or automatically at different decimation rates and file lengths.
* FTP push archived data to multiple locations.
* Perform automatic quality control of archived RINEX data.
* Manage an entire network of reference stations.
* Supply single base or network RTK corrections to many users using various communication methods, including for example, Ntrip .
* Protect and manage access to RTK correction services using the Spider Business Center advanced user access management.

Connecting the GR10/GR25 to Leica GNSS Spider:

Connect to Leica GNSS Spider in the following ways:
* TCP/IP Ethernet over LAN, WAN or Internet
* TCP/IP Mobile Internet using GPRS, EDGE or UMTS
* USB client connection to a PC/Laptop
* RS232 Lemo serial connection to a PC/Laptop

☞ For TCP/IP connections, both Active and Passive connections are supported by direct TCP/IP. Active and Passive connections to Leica GNSS Spider are also supported using NTRIP with GR10/GR25 firmware v2.5 onwards. Bluetooth connections to Leica GNSS Spider are also possible, but not recommended.

1.6 Software

Description   All instruments use the same software concept.

GR Series software

Software type	Description
GR firmware (GR10_x.xx.xxx.fw) (GR25_x.xx.xxx.fw)	The GR Series firmware is called RefWorx. This important system software covers the basic functions of the instrument.
	The onboard Web interface is integrated into the firmware and cannot be deleted.
	The English language is integrated into the firmware and cannot be deleted.
Language software (REF_LANG.sxx)	Numerous languages are available for the instrument web server. Language software is also referred to as system language.
	The system software enables a maximum of three languages which can be stored at any one time - the English language and two other languages. The English language is the default language and cannot be deleted. One language is chosen as the active language.

Software upload

Software for	Description
All GR models	All software is stored in the System RAM of the instrument.
	A new firmware file must be uploaded to the SD card before installation. The file can be uploaded via: • the Web interface. • direct copy to the SD card using a computer. • direct FTP access to the SD card. After uploading, the firmware must be transferred from the SD card to the System RAM via the Web interface. Refer to the "GR Series Operational Manual (Online Help)" for further information.
	Leica GNSS Spider can also be used to install the firmware. Loading the firmware to the SD card and installing it on the instrument is done in one step when using GNSS Spider. Refer to the "Leica GNSS Spider Online Help" for more information.

1.7   Power Supply

General   Use the Leica Geosystems power supplies, batteries, chargers and accessories
                            or accessories recommended by Leica Geosystems to ensure the correct func-
                            tionality of the instrument.

Power options   Power for the instrument can be supplied either by power supply or batteries.
                            Up to two external power supplies can be connected using a Y-cable.

                            Internal power supply: For the GR25 only, GEB241 (754834) battery or
                                                      GEB242 (793975) battery for internal power supply.
                                                      Battery can be charged from an external power
                                                      source.

                            External power supply: GEV242 (774437), 110 V/240 V AC to 24 V DC power
                                                      supply unit, supplied by Leica Geosystems.
                                                      OR
                                                      GEV251 (722409) 110 V/240 V AC to 12 V DC power
                                                      supply unit, supplied by Leica Geosystems.
                                                      OR
                                                      GEB171 (439038) battery connected via a cable.
                                                      OR
                                                      Car battery connected via a converter cable supplied
                                                      by Leica Geosystems.
                                                      OR
                                                      For GR25 only, Power over Ethernet via a category 5
                                                      Ethernet cable or higher to supply 13W of power over
                                                      Ethernet.

                            Y-cable: GEV243 (774438), Y-cable can be used with GEV242
                                                      power supply and GEB171 battery or the existing 12 V
                                                      power supply (722409). The black Lemo connector on
                                                      this cable only supports the use of the GEV242 power
                                                      supply.
                                                      OR
                                                      GEV172 (733298), Y-cable can be used with any
                                                      combination of 110 V/240 V AC to 12 V DC power
                                                      supply (722409) or a GEB171 battery.

☞   When using the GR10 for permanent operations use **U**ninterruptible **P**ower
                            Supply units as a back-up in a main power failure.

                            The GR25 has a built-in battery and charger that can act as a short term **U**nin-
                            terruptible **P**ower **S**upply. For long-term protection against power failure, an
                            external **U**ninterruptible **P**ower **S**upply can also be used.

2 Installation

2.1 Before Installation

Installation location

It is recommended that the instrument is installed so that it is
- protected from mechanical influences and lightning
- within 70 m of the antenna, without the need to use inline amplifiers.
- located sufficiently far enough away from potential sources of radio frequency interference. High-power signals from nearby radio, radar or GSM/GPRS/UMTS cell towers can cause problems with GNSS tracking. Such interference is not harmful to the instrument but could cause a loss of GNSS data.

Installation orientation

- For inside assembly, the instrument can be installed in any direction
- When installing the instrument outside, orientate the instrument vertically so that the connector points are pointing downwards

Cable installation

Ensure that the cables between the instrument and antenna are positioned to prevent them from becoming bent, stretched or squeezed. For the installation of the cables, the general rules for the installation of electrical wiring apply.

☞ Please consider that a well-planned and thoroughly carried out electric installation not only protects the cables against damage, but also looks professional.

☞ For detailed installation information, refer to the "GNSS Reference Station and Networks - An Introductory Guide".
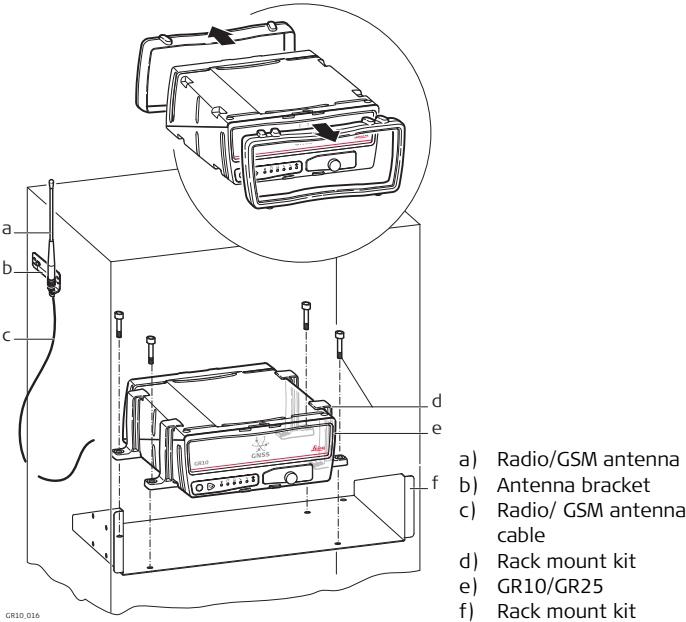
2.2　Installation Options

Description　GR Series instruments are designed for various installation cases. Below is a short description of four installation cases for the instrument. Please note that the diagrams do not show all the equipment required for a complete reference station installation. For full installation details, please refer to the
- GNSS Reference Station and Networks - An Introductory Guide.
- GNSS Networks and Reference Stations Equipment List

Rack Mount　Together with the rack mount accessory kit the instrument can be easily mounted into a standard 19 inch IT rack.

a)　Radio/GSM antenna
b)　Antenna bracket
c)　Radio/ GSM antenna cable
d)　Rack mount kit
e)　GR10/GR25
f)　Rack mount kit

GR10_016

☞　If space in the rack is limited, then the rubber bumpers on the instrument can be removed. The total height of the rack kit and instrument is then 2U. If the bumpers are removed, please remove the small feet from the mounting brackets.

☞　The radio/GSM antenna must be installed on the outside of the rack if a slot-in or serial device is used.

Wall / Cabinet Mount   Together with the wall mount accessory kit the instrument can be easily mounted onto an existing wall or structure, or inside an environmental case.


GR10_017
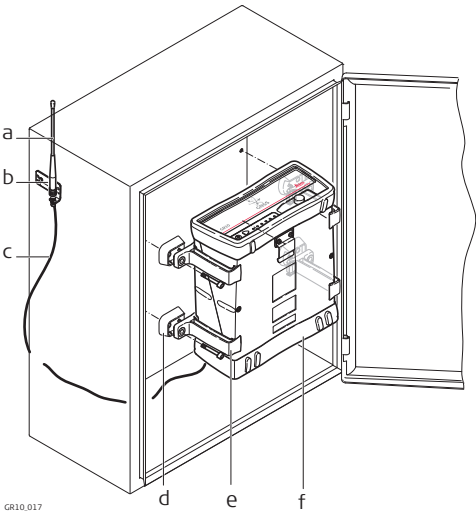
a) Radio/GSM antenna
b) Antenna bracket
c) Radio/GSM antenna cable
d) Wall mount kit - feet
e) Wall mount kit - bracket
f) Rubber bumper

☞   If space in the cabinet is limited, then the rubber bumpers on the instrument can be removed. If the bumpers are removed, please remove the small feet from the mounting brackets.

☞   The radio/GSM antenna must be installed on the outside of the rack if a slot-in or serial device is used.

Free Standing / Stacking   The instrument is designed to allow stable free standing installation and stacking for easy configuration of multiple receivers.

GR10_018
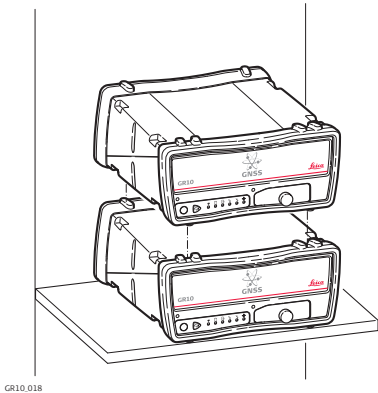
☞   When stacking multiple instruments on top of each other, the rubber bumpers must be on.

Tripod   The instrument has a built-in Tripod mount to allow attachment to all Leica
                    Geosystems Tripods.
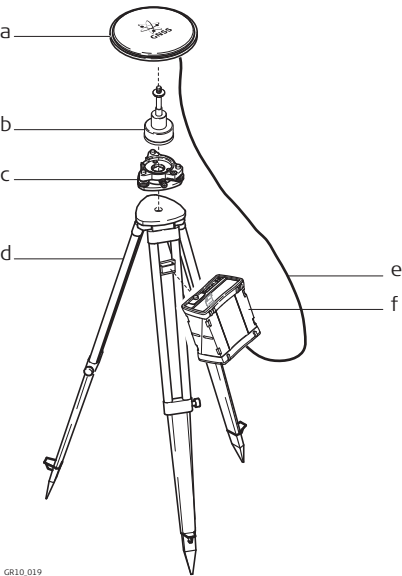
a) AR10/AS10(shown)
b) GNSS antenna carrier with
   5/8 inch screw
c) Tribrach
d) Tripod
e) Antenna cable
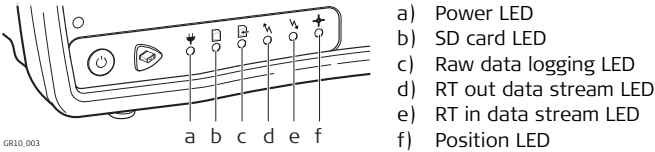f) GR10/GR25

☞ When using the instrument on a tripod, the rubber bumpers must be
   on.

3 GR10 User Interface

3.1 LED Indicators on GR10

LED indicators

Description

The GR10 has **L**ight **E**mitting **D**iode indicators. They indicate the basic instrument status.
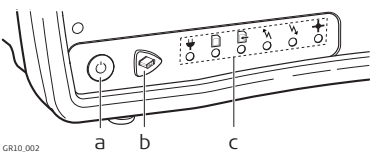
Diagram

GR10_003   a b c d e f

a) Power LED
b) SD card LED
c) Raw data logging LED
d) RT out data stream LED
e) RT in data stream LED
f) Position LED

Description of the LED's

IF the	is	THEN
Power LED ⚡	off	The instrument is turned off.
	green	The instrument is turned on.
SD card LED 🗋	off	No SD card inserted or power is off.
	green	SD card is inserted. The free space on the SD card is greater than 20%.
	yellow	The free space on the SD card is below 20%. ☞ **Recommended user action:** Activate the Smart clean-up or the automatic file delete for each logging session.
	red	SD card is full. Data logging has stopped. ☞ **Recommended user action:** Immediately activate the Smart clean-up or the automatic file delete for each logging session.

IF the	is	THEN
Raw data logging LED 📑	off	No active logging sessions or power is off.
	green	Active logging sessions are configured on the instrument and data is being logged
	yellow	Active logging sessions are configured and Smart clean-up is deleting data from all or some of the configured logging sessions. OR Active logging sessions are configured but no position is available. ☞ **Recommended user action:** Check the remaining space of the SD card and delete old data if necessary. Check the tracking and position status.
	red	Active logging sessions are configured but the SD card is full or no satellites are tracked. ☞ **Recommended user action:** Check the SD card and the tracking status.
RT out data stream LED 🗲	off	No active data stream is configured or power is off.
	green	One or more data streams are configured and active. Data is being streamed.
	red	Data streams are active but no data is streamed. ☞ **Recommended user action:** Check that data is tracked and a navigated position is available. Check that the correct reference position is entered.
RT in data stream LED 🗲	off	No active real time in data stream or power is off.
	green	A real time in data stream is configured and active, data is received and a fixed position is available.
	flashing green	A real time in data stream is configured and active, data is received and a DGPS position is available.
	yellow	A real time in data stream is configured and active, data is received but no fixed or DGPS position is available.
	red	Incoming data streams are active but no data is received. OR Incoming data stream is configured and active but the instrument is not tracking satellites and/or no navigated position is available. **Recommended user action:** Check that the incoming data connection is set up correctly. Check the tracking and position of the instrument.

IF the	is	THEN
Position LED ⟡	off	The instrument is switched off.
	flashing green	The instrument is tracking satellites but no position is available.
	green	A navigated position is available.
	red	No satellites are tracked and no navigated position is available.

3.2   Keyboard

GR10 Keyboard

a) ON/OFF button
b) Function button
c) LED's

GR10_002   a   b   c

☞ The instrument can be turned on and off by holding down the ON/OFF button for 2 s. A green steady light at the power LED indicates that the instrument is turned on and ready.

ON/OFF button

Button	Function
ON/OFF	If GR10 already off: Turns on GR10 when held for 2 s. If GR10 already on: Turns off GR10 when held for 2 s.

☞ Hold the ON/OFF button for 10 s, to force the instrument to turn off. Instrument settings and some data can be lost when using this method.

Function button   ☞ All the following functions described assume the GR10 is already on.

Button	Function
Function	The Function and ON/OFF button work in combination and allow a number different functions as described in "Button combinations". The Function button switches between these different functions.

Button combinations

Buttons	How to
+	**Activate dual button functionality** Press and hold both buttons until all LEDs are flashing. After 1 s, the 🔲 Raw data logging LED starts flashing. The following instrument commands are now activated.
	Start/Stop all logging sessions Activate the dual button functionality. If all logging sessions had been off, the Raw data logging LED is flashing green.

Buttons		How to
	3 s	• Press the Function button until the LED flashes quickly to START all configured logging sessions if the Raw data logging LED is flashing green. OR If any logging session had been active, the Raw data logging LED is flashing red. • Press the Function button until the LED flashes quickly to STOP all active logging sessions if the Raw data logging LED is flashing red. After logging has been started or stopped, the LED and instrument functionality goes back to general behaviour.
	1 X	**Start/Stop all data streams** Activate the dual button functionality. Press the Function button until the 𝖭 RT out data streams LED starts flashing slowly. If all data streams had been off, the RT out data stream LED is flashing green.
	3 s	• Press the Function button until the LED flashes quickly to START all configured data streams if the RT out data steam LED is flashing green. If any data stream had been active, the RT out data stream LED is flashing red. OR • Press the Function button until the LED flashes quickly to STOP all active data streams if the RT out data stream LED is flashing red. After data streams have been started or stopped, the LED and instrument functionality goes back to general behaviour.
	2 X	**Initialise the measurement engine** Activate the dual button functionality. Press the Function button until the ⌖ Position LED starts flashing slowly.
	3 s	• Press the Function button until the LED flashes quickly to reset the measurement engine. This action will delete all almanac and ephemeris information and the instrument will take a few minutes to restart tracking satellites. After the measurement engine has been initialised, the LED and instrument functionality goes back to general behaviour.

Buttons	How to
3 X 3 s	**Format receiver settings** Activate the dual button functionality. Press the Function button until the 🔌 Power LED starts flashing slowly: • Press the Function button until the LED flashes quickly to set all configured instrument settings back to factory default values. After the system format is completed, the LED and instrument functionality goes back to general behaviour.
4 X 3 s	**Format the SD card** Activate the dual button functionality. Press the Function button until the ▢ SD card LED starts flashing slowly: • Press the Function button until the LED flashes quickly to format the SD card. After the SD card format is completed, the LED and instrument functionality goes back to general behaviour.
5 X	**Exit combined button functionality** • Use the buttons functionality as described above. OR • To return to normal instrument functionality, press the Function button until all LEDs stop flashing.

3.3　USB and SD Card Cover

USB port and SD card slot

Description
The GR10 has a USB port and an SD card slot.

Diagram

GR10_020　a　b
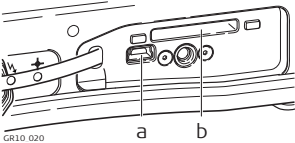
a)　USB client port
b)　SD card slot

USB client port
The USB client port can be used to:
- connect the GR10 to a computer and access the GR10 Web interface and FTP server.
- connect the GR10 to a CS10/CS15 field controller and access the GR10 Web interface.

SD card slot
Data is stored on a removeable SD card.
For more information on how to work with the SD card, refer to "6.3 Working with the Memory Device"

☞　If no SD card is inserted, data storage is not possible.

☞　Unplugging connection cables or removing the SD card during data logging or streaming can cause loss of data. Switch off the instrument before removing the SD card.

☞　While other SD cards can be used, Leica Geosystems recommends only using Leica SD cards. Leica Geosystems is not responsible for data loss or any other error that can occur while using a non-Leica card.

☞　SD cards can directly be used in the Leica USB Card Reader (767895 MCR7). Other computer card drivers can require an adaptor.

☞　If formatting the SD card is necessary, we highly recommend to format the SD card on the instrument. Refer to the GR Series Operational Manual (Online Help) for detailed instructions.

SD card capacity
Maximum supported capacity: 32 GB.

4 GR25 User Interface

4.1 LED Indicators on GR25

LED indicators

Description

The GR25 has **L**ight **E**mitting **D**iode indicators. They indicate the basic instrument status.
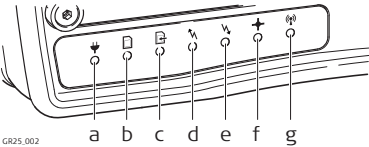
Diagram

GR25_002

a) Power LED
b) SD card LED
c) Raw data logging LED
d) RT out data stream LED
e) RT in data stream LED
f) Position LED
g) Bluetooth LED

Description of the LED's

IF the	is	THEN
Power LED	off	The instrument is turned off.
	green	The instrument is turned on.
	flashing green	The instrument is on but has switched to a backup power source. If an internal battery is used, indicates that the remaining battery capacity is high.
	yellow	Only shown if using an internal battery. The remaining battery capacity is low. ☞ **Recommended user action:** Provide an alternative power source.
	red	Only shown if using an internal battery. The remaining battery capacity is critical. ☞ **Recommended user action:** Switch to a new power source immediately.
	flashing yellow	The internal battery is charging. ☞ Charging is only indicated by LEDs when the instrument is turned off. When the instrument is on, the LEDs indicate the current power level.
	flashing red	Charging of the internal battery is activated but there is an error in charging the battery. ☞ **Recommended user action:** Check and reattach the battery. If the problem does not disappear, please send the battery to Leica Geosystems Service. ☞ Charging is only indicated via LEDs when the instrument is turned off. When the instrument is on, the LEDs indicate the current power level.

IF the	is	THEN
SD card LED	off	No SD card inserted or power is off.
	green	SD card is inserted. The free space on the SD card is greater than 20%.
	yellow	The free space on the SD card is below 20%. ☞ **Recommended user action:** Activate the Smart clean-up or the automatic file delete for each logging session.
	flashing green	Use of external USB drive is configured but the device is not available. Data is written to the SD card. The free space on the SD card is greater than 20%.
	flashing yellow	Use of external USB drive is configured but the device is not available. Data is written to the SD card. The free space on the SD card is below 20%.
	red	SD card is full. Data logging has stopped. ☞ **Recommended user action:** Immediately activate the Smart clean-up or the automatic file delete for each logging session.
Raw data logging LED	off	No active logging sessions or power is off.
	green	Active logging sessions are configured on the instrument and data is being logged
	yellow	Active logging sessions are configured and Smart clean-up is deleting data from all or some of the configured logging sessions. OR Active logging sessions are configured but no position is available. ☞ **Recommended user action:** Check the remaining space of the SD card and delete old data if necessary. Check the tracking and position status.
	red	Active logging sessions are configured but the SD card is full or no satellites are tracked. ☞ **Recommended user action:** Check the SD card and the tracking status.
RT out data stream LED	off	No active data stream is configured or power is off.
	green	One or more data streams are configured and active. Data is being streamed.
	red	Data streams are active but no data is streamed. ☞ **Recommended user action:** Check that data is tracked and a navigated position is available. Check that the correct reference position is entered.

IF the	is	THEN
RT in data stream LED ⋏	off	No active real-time in data stream or power is off.
	green	A real-time in data stream is configured and active, data is received and a fixed position is available.
	flashing green	A real-time in data stream is configured and active, data is received, a DGPS position is available.
	yellow	A real-time in data stream is configured and active, data is received but no fixed or DGPS position is available.
	red	Incoming data streams are active but no data is received. OR Incoming data stream is configured and active but the instrument is not tracking satellites and/or no position is available. ☞ **Recommended user action:** Check that the incoming data connection is set up correctly. Check the tracking and position of the instrument.
Position LED ⊹	off	The instrument is switched off.
	flashing green	The instrument is tracking satellites but no position is available.
	green	A navigated position is available.
	red	No satellites are tracked and no navigated position is available.
Bluetooth LED ⦾	off	No wireless signal (not configured or no connection established).
	blue	Bluetooth connection configured and connected.

4.2 Keyboard and Display

GR25 Keyboard and display
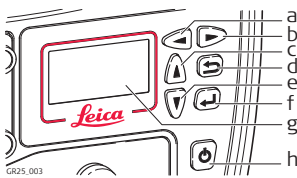
a) Left button
b) Right button
c) Up button
d) Cancel button
e) Down button
f) Enter button
g) Display
h) ON/OFF button

☞ The instrument can be turned on and off by holding down the ON/OFF button for 3 s. A green steady light at the power LED indicates that the instrument is turned on and ready.

ON/OFF button

Button	Function
ON/OFF	If GR25 is already off: Turns on GR25 when held for 3 s.
	If GR25 is already on: Turns off GR25 when held for 3 s.

☞ Hold the ON/OFF button for 10 s, to force the instrument to turn off. Instrument settings and some data can be lost when using this method.

Arrow buttons

Button	Function
Left/Right Up/Down	To scroll through menus and configuration options. For editable fields use the arrow buttons for scrolling and selecting alphanumeric fields.

Cancel button

Button	Function
Cancel	To exit pages without storing changes.

Enter button

Button	Function
Enter	To select menu items, open new pages and select options.

4.3 USB and SD Card Cover

USB port and SD card slot

Description

The GR25 has a USB host port, USB client port and an SD card slot.

Diagram
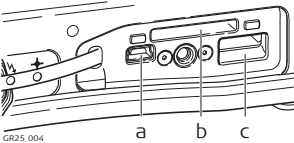
a) USB client port
b) SD card slot
c) USB host port

USB client port

The USB client port can be used to:
- connect the GR25 to a computer and access the Web interface and FTP server.
- connect the GR25 to a CS10/CS15 field controller and access the Web interface.

USB host port

The USB host port can be used to:
- connect a USB mass storage device to the GR25 and push MDB and RINEX data from the SD card.

SD card slot

Data is stored on a removeable SD card.
For more information on how to work with the SD card, refer to "6.3 Working with the Memory Device"

☞ If no SD card is inserted, data storage is not possible.

☞ Unplugging connection cables or removing the SD card during data logging or streaming can cause loss of data. Switch off the instrument before removing the SD card.

☞ While other SD cards can be used, Leica Geosystems recommends only using Leica SD cards. Leica Geosystems is not responsible for data loss or any other error that can occur while using a non-Leica card.

☞ SD cards can directly be used in the Leica USB Card Reader (767895 MCR7). Other computer card drivers can require an adaptor.

☞ If formatting the SD card is necessary, we highly recommend to format the SD card on the instrument. Refer to the GR Series Operational Manual (Online Help) for detailed instructions.

SD card capacity

Maximum supported capacity: 32 GB.

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5   Equipment Setup

5.1   Basic Setup

Description

GR10_005

Step	Description
1.	Plug the power cable/power supply into the GR10/GR25.
2.	Insert the SD card into the SD card slot. For more information on how to work with the SD card, refer to "6.3 Working with the Memory Device".
3.	Turn on the GR10/GR25.
4.	Attach the antenna cable, for example the GEV194, 1.8 m antenna cable, to the instrument's antenna port and to the connector on the antenna.
☞	To access the instrument via Ethernet or USB refer to: • "5.2 Setup via Web Interface over Ethernet and DHCP" • "5.3 Setup in a Non-DHCP Network" • "GR25 setup in a non-DHCP network using display and buttons" • "5.4 Install USB drivers" • "5.4.4 Setup via Web Interface over USB" Refer to the "GR Series Operational Manual (Online Help)" for detailed information on the Web interface.

5.2 Setup via Web Interface over Ethernet and DHCP

Setup via Web Interface over Ethernet and DHCP

GR10_006
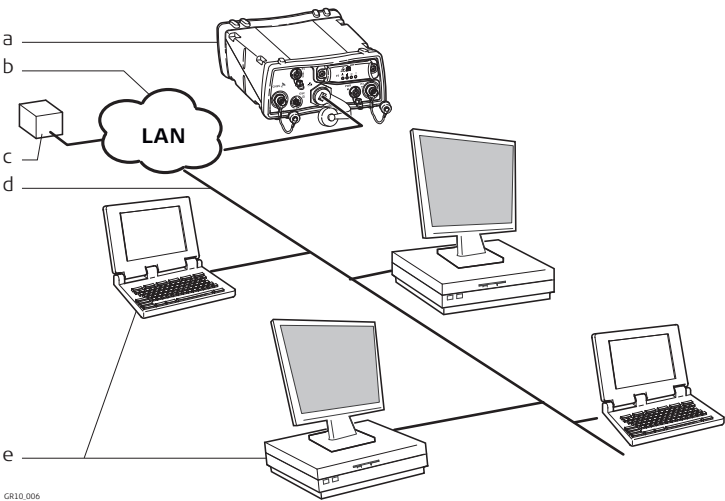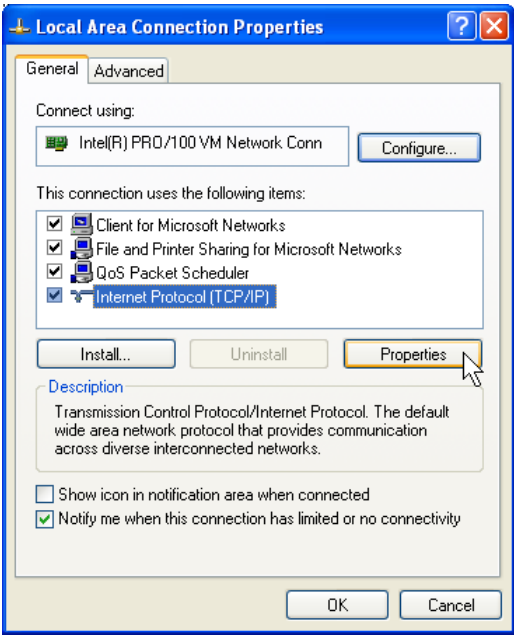
a) GR10/GR25
b) Local network (LAN)
c) DHCP server
d) Ethernet cable
e) Computers with Web interface
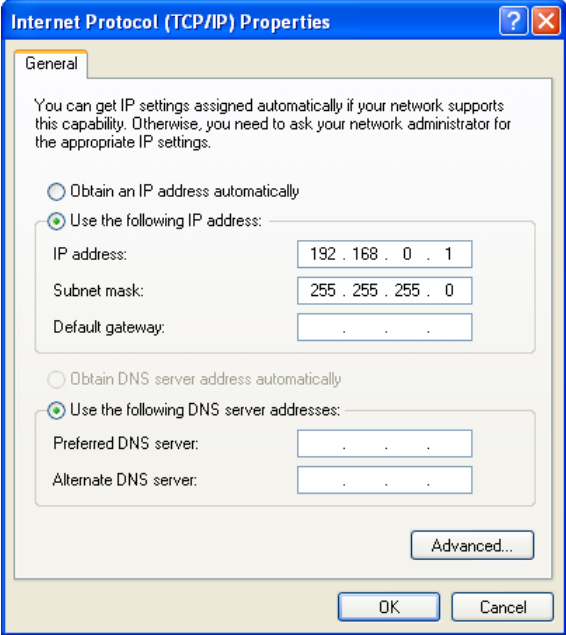
Step	Description
1.	Start the computer.
2.	To connect the instrument to the local LAN supporting DHCP, plug an Ethernet cable into the Ethernet port on the back of the GR10/GR25.
3.	Turn on the GR10/GR25.
4.	Open a browser window on your computer.
5.	Type "GR*******" into the browsers address field, where ******* is the serial number of the instrument. For example, GR1700001.
6.	The Web interface will now be accessible.
7.	Use the default **User name** (Admin) and **Password** (12345678). ☞ After logging in the first time you must create a new user account, including a new user name and password. The default user account can then be deleted. Refer to the GR Series Operational Manual (Online Help) for a step-by-step guide.
8.	Configure the GR10/GR25 for all required settings.
☞	Refer to the GR Series Operational Manual (Online Help) for further details on using the instruments Web interface.

5.3 Setup in a Non-DHCP Network

Setup in a non-DHCP network

If the instrument is setup in a non-DHCP network, the web interface can still be accessed using a crossed Ethernet cable.

Setup for Windows XP

Step	Description
1.	Start the computer.
2.	Connect the crossed Ethernet cable to the computer and the Ethernet port on the back of the GR10/GR25.
3.	Turn on the GR10/GR25.
4.	On the computer go **Start / Control Panel / Network Connections**.
5.	Select the Network connection used with the crossed Ethernet cable, right click and select **Properties**.
6.	In the General tab, highlight **Internet Protocol** and press **Properties**

Step	Description
7.	Select **Use the following IP address** and enter • **IP address:** 192.168.0.1 • **Subnet mask:** 255.255.255.0 **Internet Protocol (TCP/IP) Properties** General You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings. ○ Obtain an IP address automatically ● Use the following IP address: IP address: 192 . 168 . 0 . 1 Subnet mask: 255 . 255 . 255 . 0 Default gateway: . . . ○ Obtain DNS server address automatically ● Use the following DNS server addresses: Preferred DNS server: . . . Alternate DNS server: . . . Advanced... OK Cancel
8.	Press OK.
9.	Open a browser window and enter 192.168.0.3 to open the Web interface.
☞	Per default, the GR10/GR25 instrument is configured to obtain an IP address automatically from a DHCP network. To use the default static IP address 192.168.0.3, reboot the GR10/GR25 once it is connected to the crossed Ethernet cable.

GR25 setup in a non-DHCP network using display and buttons

In a field campaign the GR25 can be configured through the display and buttons, to start or stop pre-configured data streams and logging sessions.

For initial setup, the GR25 IT configuration for setup in a non-DHCP network can be done through the display and buttons.

a) Left button
b) Right button
c) Up button
d) Cancel button
e) Down button
f) Enter button
g) Display
h) ON/OFF button

Step	Description
1.	Turn on the GR25.
2.	Use the arrow buttons, go to **Configuration, Site Config**. Enter the coordinates, antenna type and site code.
3.	Press **Enter** to store all changes.
4.	Use the arrow buttons go to **Configuration, Network Config**. Enter the IP address, Subnet mask and gateway of the network to connect the instrument to.
5.	Press **Enter** to store all changes.
6.	For a field campaign setup, select **Logging/Streaming** and start or stop pre-configured data streams and logging sessions.
7.	Press **Enter** to store all changes.
8.	Refer to the "GR Series Operational Manual (Online Help) for further details on using the instrument.

5.4 Install USB drivers

Before you begin

Before connecting the instrument to a computer using a USB cable, you must first install USB drivers. To install the USB drivers refer to:
- "5.4.1 Install USB drivers for Windows XP operating systems".
- "5.4.2 Install USB drivers for Windows Vista operating systems".
- "5.4.3 Install USB drivers for Windows 7 operating systems".

☞ Only one instrument can be connected to the computer via USB at a time.

5.4.1 Install USB drivers for Windows XP operating systems

Install USB drivers for Windows XP for the first time

GR10_007

Step	Description
1.	Turn on the instrument.
2.	Start the computer.
3.	Insert the Leica GR Series DVD.
4.	Run the installer executable depending on your CPU and operating system to install the drivers necessary for your instrument. a) 32 bit CPU: SetupViva&GR_USB_32bit.exe b) 64 bit CPU: SetupViva&GR_USB_64bit.exe c) Itanium 64 bit CPU: SetupViva&GR_USB_64bit_itanium.exe
5.	The **Welcome to InstallShield Wizard for Leica Viva & GR USB drivers** window appears.
☞	Make sure all GR or Viva devices are disconnected from the computer.
6.	Click **Next>**.
7.	The **Ready to Install the Program** window appears.
8.	Click **Install**. The drivers are installed on your computer.
9.	Click **Continue Anyway** every time a window pops up saying that the software has not passed the Windows Logo testing.
10.	The **InstallShield Wizard Completed** window appears.
11.	Read the instructions and check the box, **I have read the instructions**. These instructions are listed in detail in the following steps.

Step	Description
12.	Click **Finish** to exit the wizard.
13.	Click **Yes** to restart the system so all changes take effect. ☞ For Windows XP users with Service Pack 3: Windows does not require a restart.
14.	Loosen the screw on the SD card/USB port cover.
15.	Open the SD card/USB port cover.
16.	Plug the USB cable into the USB port on the instrument.
17.	Plug the USB cable into the USB port of the computer.
18.	Wait until the new hardware wizard starts up automatically. Select, **No, not this time** and click **Next>**. ☞ It can take some time for the wizard to start.
19.	Click **Next>** to install the software automatically.
20.	Click **Continue Anyway** when a window pops up saying that this software has not passed the Windows Logo testing.
21.	Click **Finish** to exit the wizard.
22.	Another found new hardware wizard starts up automatically. Select, **No, not this time** and click **Next>**.
23.	Click **Next>** to install the software automatically.
24.	Click **Finish** to exit the wizard. ☞ Windows will show **searching for IP address**. Ignore this and go to the next step.
25.	Run shortcut **Configure GR connection** which has been configured on the Windows desktop. ☞ There are two more shortcuts created for the Leica GS and CS. These shortcuts can be ignored, unless these devices are needed on this computer. Refer to the GS or CS User Manual for further information.
26.	A DOS window is opened and a batch file is started to configure the IP settings for the RNDIS network adapter.
27.	Press any key to close the DOS window.
28.	Disconnect and reconnect the USB cable.
29.	Open a browser and type in the IP address: 192.168.254.2 to access the instruments Web interface.
30.	Use the default **User name** (Admin) and **Password** (12345678). ☞ After logging in the first time you must create a new user account, including a new user name and password. The default user account can then be deleted. Refer to the GR Series Operational Manual (Online Help) for a step-by-step guide.
31.	Configure the instrument for all required settings.
☞	Please make sure that JavaScript is allowed to run on the web browser. Check the browser settings if you have problems using the Web interface.

5.4.2 Install USB drivers for Windows Vista operating systems

Install USB drivers for Windows Vista for the first time

GR10_007a

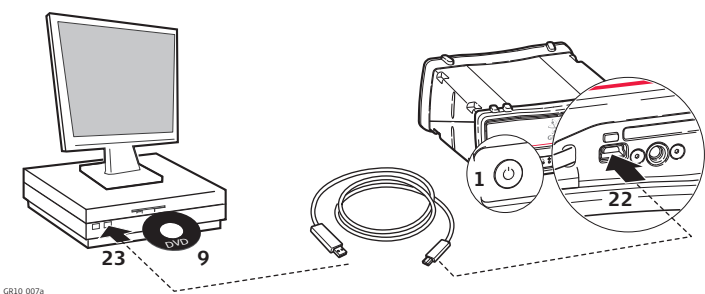| Step	Description
1.	Turn on the instrument.
2.	Start the computer.
3.	Disable the User Account Control before installing the drivers.
4.	Go to **Start** ⇒ **Control Panel** ⇒ **User Accounts and Family Safety** (or **User Accounts**, if you are connected to a network domain) ⇒ **User Accounts**.
5.	Select **Turn User Account Control on or off**. ☞ Enter the computer administrators password if prompted.
6.	Disable the check box, **Use User Account Control (UAC)to help protect your computer**.
7.	Click **OK**.
8.	Restart the computer for all changes to take effect.
9.	Insert the Leica GR Series DVD.
10.	Run the installer executable depending on your CPU and operating system to install the drivers necessary for your instrument. a) 32 bit CPU: SetupViva&GR_USB_32bit.exe b) 64 bit CPU: SetupViva&GR_USB_64bit.exe c) Itanium 64 bit CPU: SetupViva&GR_USB_64bit_itanium.exe
11.	Wait until the **Mobile Device Center Driver Update** is finished.
12.	The **Welcome to InstallShield Wizard for Leica Viva & GR USB drivers** window appears.
13.	Click **Next>**.
14.	The **Ready to Install the Program** window appears.
15.	Click **Install**. The drivers are installed on your computer.
16.	Click **Install this driver software anyway** every time a window pops up saying that the software has not passed the Windows Logo testing.
17.	The **InstallShield Wizard Completed** window appears.
18.	Read the instructions and check the box, **I have read the instructions**. These instructions are listed in detail in the following steps.

Step	Description
19.	Click **Finish** to exit the wizard.
20.	Loosen the screw on the SD card/USB port cover.
21.	Open the SD card/USB port cover.
22.	Plug the USB cable into the USB port on the instrument.
23.	Plug the USB cable into the USB port of the computer. ☞ Windows will show **searching for IP address**. Ignore this and go to the next step.
24.	Run shortcut **Configure GR connection** which has been configured on the Windows desktop. ☞ There are two more shortcuts created for the Leica GS and CS. These shortcuts can be ignored, unless these devices are needed on this computer. Refer to the GS or CS User Manual for further information.
25.	A DOS window is opened and a batch file is started to configure the IP settings for the RNDIS network adapter.
26.	Press any key to close the DOS window.
27.	Disconnect and reconnect the USB cable.
28.	Open a browser and type in the IP address: 192.168.254.2 to access the instruments Web interface.
29.	Use the default **User name** (Admin) and **Password** (12345678). ☞ After logging in the first time you must create a new user account, including a new user name and password. The default user account can then be deleted. Refer to the GR Series Operational Manual (Online Help) for a step-by-step guide.
30.	Configure the instrument for all required settings.
☞	Please make sure that JavaScript is allowed to run on the web browser. Check the browser settings if you have problems using the Web interface.

5.4.3 Install USB drivers for Windows 7 operating systems

Install USB drivers for Windows 7 for the first time

GR10_007a

Step	Description
1.	Turn on the instrument.
2.	Start the computer.
3.	Disable the User Account Control before installing the drivers.
4.	Go to **Start** ⇒ **Control Panel** ⇒ **User Accounts and Family Safety** (or **User Accounts**, if you are connected to a network domain) ⇒ **User Accounts**.
5.	Go to **Change User Account Control** settings.
6.	Select level, **Never Notify** and click **OK**.
7.	When asked to allow the change, click **Yes** to confirm.
8.	Restart the computer for all changes to take effect.
9.	Insert the Leica GR Series DVD.
10.	Run the installer executable depending on your CPU and operating system to install the drivers necessary for your instrument. a) 32 bit CPU: SetupViva&GR_USB_32bit.exe b) 64 bit CPU: SetupViva&GR_USB_64bit.exe c) Itanium 64 bit CPU: SetupViva&GR_USB_64bit_itanium.exe
11.	Wait until the **Mobile Device Center Driver Update** is finished.
12.	The **Welcome to InstallShield Wizard for Leica Viva & GR USB drivers** window appears.
13.	Click **Next>**.
14.	The **Ready to Install the Program** window appears.
15.	Click **Install**. The drivers will be installed on your computer.
16.	Click **Install this driver software anyway** every time a window pops up saying that the software has not passed the Windows Logo testing.
17.	The **InstallShield Wizard Completed** window appears.
18.	Read the instructions and check the box, **I have read the instructions**. These instructions are listed in detail in the following steps.
19.	Click **Finish** to exit the wizard.

Step	Description
20.	Loosen the screw on the SD card/USB port cover.
21.	Open the SD card/USB port cover.
22.	Plug the USB cable into the USB port on the instrument.
23.	Plug the USB cable into the USB port of the computer. ☞ Windows will show **searching for IP address**. Ignore this and go to the next step.
24.	Run shortcut **Configure GR connection** which has been configured on the Windows desktop. ☞ There are two more shortcuts created for the Leica GS and CS. These shortcuts can be ignored, unless these devices are needed on this computer. Refer to the GS or CS User Manual for further information.
25.	A DOS window is opened and a batch file is started to configure the IP settings for the RNDIS network adapter.
26.	Press any key to close the DOS window.
27.	Disconnect and reconnect the USB cable.
28.	Open a browser and type in the IP address: 192.168.254.2 to access the instruments Web interface.
29.	Use the default **User name** (Admin) and **Password** (12345678). ☞ After logging in the first time you must create a new user account, including a new user name and password. The default user account can then be deleted. Refer to the GR Series Operational Manual (Online Help) for a step-by-step guide.
30.	Configure the instrument for all required settings.
☞	Please make sure that JavaScript is allowed to run on the web browser. Check the browser settings if you have problems using the Web interface.

5.4.4 Setup via Web Interface over USB

Setup via Web Interface over USB

GR10_023

Step	Description
1.	Turn on the instrument.
2.	Start the computer.
3.	Loosen the screw on the SD card/USB port cover.
4.	Open the SD card/USB port cover.
5.	Plug the USB cable into the USB port on the instrument.
6.	Plug the USB cable into the USB port of the computer.
7.	Open a browser and type in the IP address: 192.168.254.2 to access the instruments Web interface.
8.	Use the default **User name** (Admin) and **Password** (12345678). ☞ After logging in the first time you must create a new user account, including a new user name and password. The default user account can then be deleted. Refer to the GR Series Operational Manual (Online Help) for a step-by-step guide.
9.	Configure the instrument for all required settings.

5.5 Setup via Web Interface over Bluetooth (GR25)

Setup via Web Interface over Bluetooth (GR25 only)

a) Left button
b) Right button
c) Up button
d) Cancel button
e) Down button
f) Enter button
g) Display
h) ON/OFF button

Step	Description
1.	Turn on the GR25.
2.	Use the arrow buttons, go to **Configuration, Network Config**. Scroll down to the Bluetooth field and use the left button to enable Bluetooth.
3.	Activate bluetooth on your computer and search for Bluetooth devices. The instruments hostname will be listed.
4.	Pair the Bluetooth connection of your computer with the instrument. The default pairing code is 0000. The pairing code can be changed later in the web interface.
5.	Once the pairing is finished, right click on the GR device listed in your Bluetooth devices panel and select **Connect**.
6.	Go to the **Network connections** panel of your computer and select the Bluetooth network connection connected to the GR instrument. Right click and open the properties.
7.	Highlight the **TCP/IP connection** and click on the **Properties** button.
8.	Enter the IP address **192.168.253.x** and subnet mask **255.255.255.0**.
9.	Open a browser and type in the IP address: 192.168.253.2 to access the Web interface.
10.	Use the default **User name** (Admin) and **Password** (12345678). ☞ After logging in the first time you must create a new user account, including a new user name and password. The default user account can then be deleted. Refer to the GR Series Operational Manual (Online Help) for a step-by-step guide.
11.	Configure the instrument for all required settings.

6 Operation

6.1 Using the Web Interface

Web Interface login Entering the instruments IP address or host name in a browser window displays the web interface login page.
- The home page is also shown after user login.
- For a partially restricted web interface access, the login as guest button can be used. This allows access to all instrument status information.

☞ The login page is not shown if the web interface access level is set to **unrestricted**. The web interface home page is opened directly. For security reasons it is not recommended to set the web interface access to **Unrestricted**. To change the access setting, go to **Receiver Setup / Access Management / Access settings**.

Web Interface - User Interface The default appearance of the Web interface consists of the following main components.
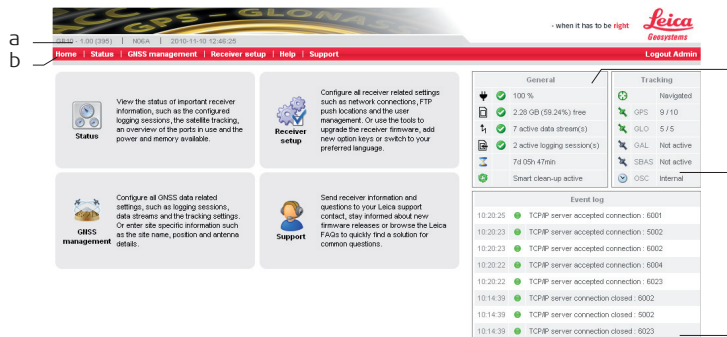
S_GR10_001

a) Header
b) Menu Bar
c) Status: General

d) Status: Tracking
e) Status: Event log

Header
The header contains general information about the instrument.
- Instrument type
- Loaded firmware version
- Site code
- Current system date and time

Menu Bar
The menu bar at the top of the display contains links to the home page, all status information, GNSS management pages, receiver setup, help and support. The menus are extended when the mouse is moved over a menu item. If a link is not available to a logged in user, it is greyed out and not accessible. Which menu items are available is dependent on
- the selected **Access to Web interface** level, and
- the selected **Web interface user level** of the logged in user.

Status: General

Provides and overview of the current status of the instrument. The icons correspond to the LED indicators on the instrument.

Status: Tracking

Provides an overview of the current tracking status of the instrument.

Status: Event log

Displays the latest eight messages from the **Status / Event log** page.

Online Help

Access	Description
Help	Press the help menu to open the complete online help.
?	Press to open context-sensitive help.
🛟	Press to activate hints on the active Web interface page.

☞ Refer to the "GR Series Operational Manual (Online Help)" for detailed information on the Web interface.

6.2 Batteries

6.2.1 Operating Principles

Charging / first-time use
- The battery must be charged prior to using it for the first time because it is delivered with an energy content as low as possible.
- The permissible temperature range for charging is between 0°C to +40°C/ +32°F to +104°F. For optimal charging, we recommend charging the batteries at a low ambient temperature of +10°C to +20°C/+50°F to +68°F if possible.
- It is normal for the battery to become warm during charging. Using the chargers recommended by Leica Geosystems, it is not possible to charge the battery if the temperature is too high.
- For new batteries or batteries that have been stored for a long time (> three months), it is effectual to make only one charge/discharge cycle.
- For Li-Ion batteries, a single discharging and charging cycle is sufficient. We recommend carrying out the process when the battery capacity indicated on the charger or on a Leica Geosystems product deviates significantly from the actual battery capacity available.

Operation / Discharging
- The batteries can be operated from -20°C to +55°C/-4°F to +131°F.
- Low operating temperatures reduce the capacity that can be drawn; high operating temperatures reduce the service life of the battery.

6.2.2 Changing the Battery

Insert and remove the battery on the GR25 step-by-step
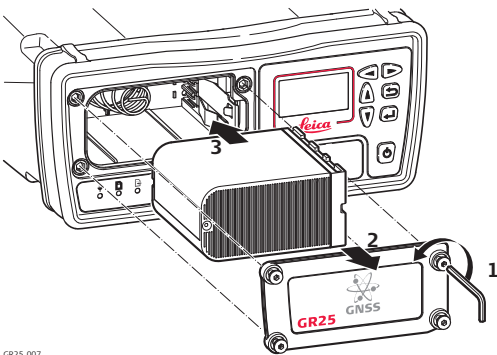
GR25_007

Step	Description
☞	The battery is inserted in the front of the instrument.
1.	Loosen the screws on the battery compartment with the Allen key provided with the GR25.
2.	Remove the battery cover.
3.	With the arrow facing forward, slide the battery into the battery compartment and push so that it locks into position.
4.	Replace the cover of the battery compartment and tighten the screws.
5.	To remove the battery, loosen the screws and remove the cover of the battery compartment.
6.	Push the ledge on the right side of the battery compartment to the right until it releases the battery.
7.	Pull out the battery.
8.	Replace the cover of the battery compartment and tighten the screws.

6.2.3 Using the GR25 Internal Battery and Charger

Charging
- Battery charging can be enabled in the GR25 Web Interface. Refer to the "GR Series Operational Manual (Online Help)" for further information.

  Note: When charging the GEB241/GEB242 battery with the GR25 internal charger, it is technically possible to charge the GEB241/GEB242 battery between 0°C to +65°C/ +32°F to +149°F. Please note the internal temperature reading on the GR25 Web Interface.
- When the GR25 is turned on, the battery charging status is indicated in the GR25 Web Interface.
- When the GR25 is powered down, battery charging is indicated via the LEDs. For further information refer to "4.1 LED Indicators on GR25".

6.3   Working with the Memory Device

☞   • Keep the card dry.
           • Use it only within the specified temperature range.
           • Do not bend the card.
           • Protect the card from direct impacts.

⚠ **WARNING**   The SD card must not be removed while the instrument is writing data to the card. To remove the SD card safely, turn off the instrument beforehand.

⚠ **WARNING**   Ensure that the instrument is off before inserting the SD card. Switching on the instrument will ensure the necessary folder structure is available on the SD card.

☞   Failure to follow these instructions could result in data loss and/or permanent damage to the card.

Insert and remove an SD card into instrument step-by-step

GR10_008
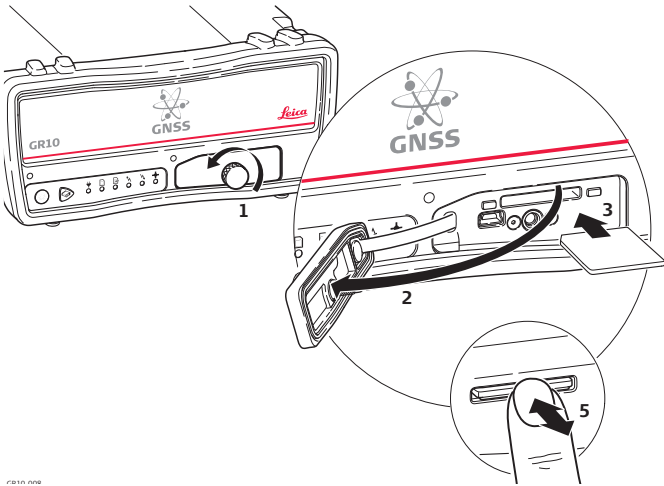
Step	Description
☞	The SD card is inserted into a slot inside the SD card/USB port cover on the front of the instrument.
1.	Loosen the screw on the SD card/USB port cover.
2.	Open the SD card/USB port cover.
3.	Place the SD card into the slot. The card should be held with the contacts downwards and facing the slot. ☞ Do not touch the contacts.
4.	Slide the card firmly into the slot until it clicks into position.
5.	To remove the SD card, gently press inwards on the card to release it from the slot.
6.	Place the SD card/USB port cover back over the slot and tighten the cover screw.

6.4 Working with Radio, Modem and GSM Devices

Description
Various devices can be used with the instrument, including
- GSM/Radio GFU devices connected via a serial port
- Slot-in devices
- External Modems connected via a serial port
- External Radios connected via a serial port

6.4.1 Serial Devices

Devices fitting into a GFU housing

Digital cellular phones fitting into a GFU housing

Digital cellular phone	GFU housing
Siemens MC75	GFU24
CDMA MultiTech MTMMC-C (US)	GFU19, GFU26
CDMA MultiTech MTMMC-C (CAN)	GFU25

Radios fitting into a GFU housing

Radio	GFU housing
Satelline 3AS, transceive	GFU14

Connecting a GFU device to a GR10/GR25

GR10_009
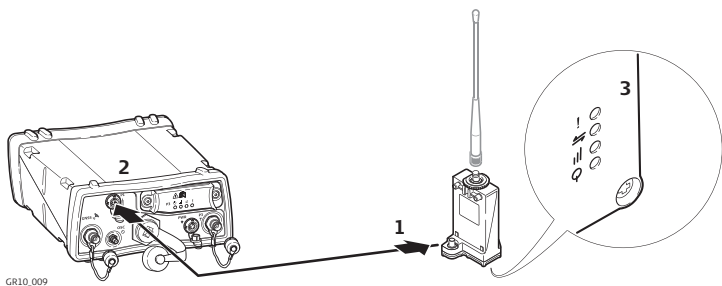
Step	Description
1.	Connect the GEV232 or GEV233 GFU cable to the serial port on the GFU housing.
2.	Connect the GEV232 or GEV233 GFU cable to the serial port on the GR10/GR25.
3.	The GFU device is successfully connected to the instrument when the LEDs on the GFU are on.

Insert and remove a SIM card step-by-step for an external GFU device

GS_087
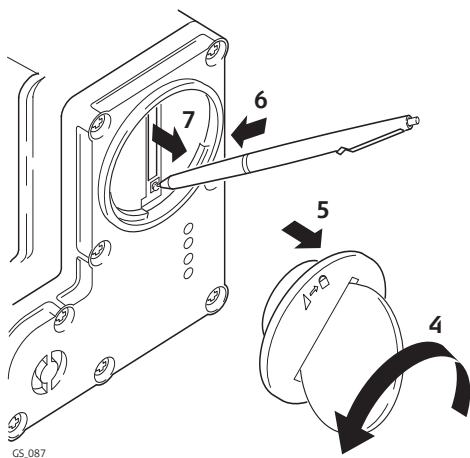
Step	Description
☞	The SIM card is inserted into a slot on the bottom of the GFU housing.
1.	Take the SIM card, a coin and a pen.
2.	Locate the SIM card screw, that covers the SIM card slot, on the bottom of the GFU housing.
3.	Insert the coin into the groove of the SIM card screw.
4.	Turn the coin anticlockwise to loosen the SIM card screw.
5.	Remove the SIM card screw from the housing.
6.	Using the pen, press the small button of the SIM card slot to eject the SIM card holder.
7.	Take the SIM card holder out off the housing.
8.	Put the SIM card into the SIM card holder, the chip facing up.
9.	Insert the SIM card holder into the SIM card slot, the chip facing the connectors inside the slot.
10.	Place the SIM card screw back on the housing.
11.	Insert the coin into the groove of the SIM card screw.
12.	Turn the coin clockwise to tighten the SIM card screw.

LED indicators

Description
Each GFU housing for a radio or digital cellular phones has **L**ight **E**mitting **D**iode indicators on the bottom side. They indicate the basic device status.

Diagram
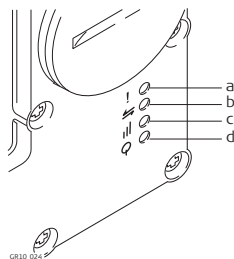
a) Warning LED, available for Satelline 3AS
b) Data transfer LED
c) Signal strength LED
d) Power LED

Description of the LED's

IF the	on	is	THEN
Warning LED	GFU14 with Satelline 3AS	red	the device is in the configuration mode controlled from the PC via cable.
Data transfer LED	any device	off	data is not being transferred.
		green or flashing green	data is being transferred.
Signal strength LED	GFU19 (US), GFU25 (CAN), GFU26 (US) with CDMA MultiTech MTMMC-C	red	device is on, not registered on the network.
		flashing red	device is on, registered on the network.
		off	download mode or device is off.
	GFU24 with Siemens MC75	red	call is in progress.
		red: long flash, long break	no SIM card inserted, no PIN entered or network search, user authentication or network login in progress.
		red: short flash, long break	logged onto network, no call in progress.
		red: flashing red, long break	GPRS PDP context activated.
		red: long flash, short break	Packet switched data transfer is in progress.
		off	device is off.
	GFU14 with Satelline 3AS	red or flashing red	the communication link, **D**ata **C**arrier **D**etection, is okay on the roving receiver.
		off	the DCD is not okay.
Power LED	any device	off	power is off.
		green	power is okay.

6.4.2 Slot-in Devices

Devices fitting into the GR10/GR25

Digital cellular phones fitting into the slot-in port (P3)

Digital cellular phone	Device
Telit 3G GSM/GPRS/UMTS	SLG1-2
CINTERION MC75i GSM/GPRS/UMTS	SLG2-2

Radios fitting into the slot-in port (P3)

Radio	Device
Satelline TA11 (TX only)	SLR1-2
Satelline M3-TR1 (TX/RX)	SLR5-1

Insert and remove a slot-in-device in a GR10/GR25

GR10_010
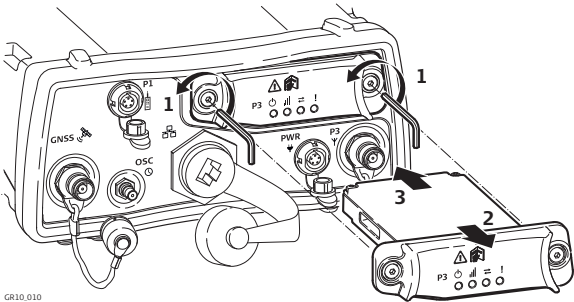
Step	Description
1.	Loosen the screws of the Communication Slot-in port (P3) with the Allen key that is supplied with the slot-in device.
2.	Remove the compartment cover and attach it to the slot-in device.
3.	Insert the slot-in device into the P3 Slot-in port. ☞ The LED's on the device must point downwards.
4.	Tighten the screws. ☞ All screws have to be tightened to ensure that the instrument is waterproof.
5.	Attach the antenna for the slot-in device to Communication Slot-in port Antenna (P3), which is located below the Slot-in port next to the Power port (PWR).

**Insert and remove
a SIM card
step-by-step**
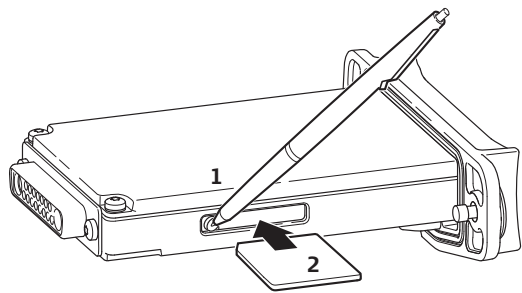
GR10_011

Step	Description
☞	The SIM card is inserted into a slot on the side of the slot-in-device.
☞	Take the SIM card and a pen.
1.	Using the pen, press the small button of the SIM card slot to eject the SIM card holder.
2.	Take the SIM card holder out of the slot-in-device.
3.	Place the SIM card into the SIM card holder, the chip facing up.
4.	Insert the SIM card holder into the SIM card slot, the chip facing the connectors inside the slot.

LED indicators

Description

Each slot-in-device for a radio or digital cellular phones has **L**ight **E**mitting **D**iode indicators on the bottom side. They indicate the basic device status.

Diagram
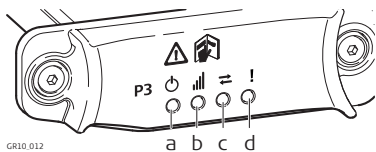
GR10_012

a) Mode LED, available for Satelline TA11
b) Signal strength LED
c) Data transfer LED
d) Power LED

Description of the LEDs

IF the	on	is	THEN
Mode LED	SLR1-2 with Satelline TA11/SLR5-1 with Satelline M3-TR1	red	the device is in the programming mode controlled from the PC via cable.
Data transfer LED	any device	off	data is not being transferred.
		flashing green	data is being transferred.

IF the	on	is	THEN
Signal strength LED	SLG1-2 with Telit 3G, SLG2-2 with Cinterion MC75i	red	call is in progress.
		red: long flash, long break	no SIM card inserted, no PIN entered or network search, user authentication or network login in progress.
		red: short flash, long break	logged on to network, no call in progress.
		red: flashing red, long break	GPRS PDP context activated.
		red: long flash, short break	Packet switched data transfer is in progress.
		off	device is off.
	SLR1-2 with Satelline TA11/SLR5-1 with Satelline M3-TR1	red	the communication link, **D**ata **C**arrier **D**etection, is okay on the roving instrument.
		flashing red	the communication link, **D**ata **C**arrier **D**etection, is okay on the roving instrument, but signal is weak.
		off	the DCD is not okay.
Power LED	any device	off	power is off.
		green	power is okay.

7 Care and Transport

7.1 Transport

Transport in a road vehicle   Never carry the product loose in a road vehicle, as it can be affected by shock and vibration. Always carry the product in its transport container and secure it.

Shipping   When transporting the product by rail, air or sea, always use the complete original Leica Geosystems packaging, transport container and cardboard box, or its equivalent, to protect against shock and vibration.

7.2 Storage

Product   Respect the temperature limits when storing the equipment, particularly in summer if the equipment is inside a vehicle. Refer to "9 Technical Data" for information about temperature limits.

Li-Ion batteries
* Refer to "9 Technical Data" for information about storage temperature range.
* Remove batteries from the product and the charger before storing.
* After storage recharge batteries before using.
* Protect batteries from damp and wetness. Wet or damp batteries must be dried before storing or use.
* A storage temperature range of -20°C to +30°C/-4°F to 86°F in a dry environment is recommended to minimise self-discharging of the battery.
* At the recommended storage temperature range, batteries containing a 50% to 100% charge can be stored for up to one year. After this storage period the batteries must be recharged.

7.3 Cleaning and Drying

Product and accessories
* Use only a clean, soft, lint-free cloth for cleaning. If necessary, moisten the cloth with water or pure alcohol. Do not use other liquids; these may attack the polymer components.

Damp products   Dry the product, the transport container, the foam inserts and the accessories at a temperature not greater than 40°C/104°F and clean them. Do not repack until everything is dry. Always close the transport container when using in the field.
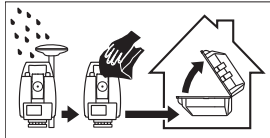
Cables and plugs   Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the connecting cables.

8   Safety Directions

8.1   General Introduction

Description   The following directions enable the person responsible for the product, and the person who actually uses the equipment, to anticipate and avoid operational hazards.

The person responsible for the product must ensure that all users understand these directions and adhere to them.

8.2   Definition of Use

Permitted use
- Carrying out measurement tasks using various GNSS measuring techniques.
- Recording GNSS and point related data.
- Data communication with external appliances.
- Measuring raw data and computing coordinates using carrier phase and code signal from GNSS satellites.

Adverse use
- Use of the product without instruction.
- Use outside of the intended limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, for example screwdriver, unless this is permitted for certain functions.
- Modification or conversion of the product.
- Use after misappropriation.
- Use of products with recognisable damages or defects.
- Use with accessories from other manufacturers without the prior explicit approval of Leica Geosystems.
- Inadequate safeguards at the working site, for example when measuring on roads.
- Controlling of machines, moving objects or similar monitoring application without additional control- and safety installations.

⚠ **WARNING**   Adverse use can lead to injury, malfunction and damage.
It is the task of the person responsible for the equipment to inform the user about hazards and how to counteract them. The product is not to be operated until the user has been instructed on how to work with it.

8.3   Limits of Use

Environment   Suitable for use in an atmosphere appropriate for permanent human habitation: not suitable for use in aggressive or explosive environments.

⚠ **DANGER**   Local safety authorities and safety experts must be contacted before working in hazardous areas, or close to electrical installations or similar situations by the person in charge of the product.

8.4 Responsibilities

Manufacturer of the product

Leica Geosystems AG, CH-9435 Heerbrugg, hereinafter referred to as Leica Geosystems, is responsible for supplying the product, including the user manual and original accessories, in a safe condition.

Person responsible for the product

The person responsible for the product has the following duties:
• To understand the safety instructions on the product and the instructions in the user manual.
• To ensure that it is used in accordance with the instructions.
• To be familiar with local regulations relating to safety and accident prevention.
• To inform Leica Geosystems immediately if the product and the application becomes unsafe.
• To ensure that the national laws, regulations and conditions for the operation of e.g. radio transmitters, lasers are respected.

8.5 Hazards of Use

⚠ **CAUTION**

Watch out for erroneous measurement results if the product has been dropped or has been misused, modified, stored for long periods or transported.
Precautions:
Periodically carry out test measurements and perform the field adjustments indicated in the user manual, particularly after the product has been subjected to abnormal use and before and after important measurements.

⚠ **DANGER**

Because of the risk of electrocution, it is dangerous to use poles and extensions in the vicinity of electrical installations such as power cables or electrical railways.
Precautions:
Keep at a safe distance from electrical installations. If it is essential to work in this environment, first contact the safety authorities responsible for the electrical installations and follow their instructions.

⚠ **WARNING**

During dynamic applications, for example stakeout procedures there is a danger of accidents occurring if the user does not pay attention to the environmental conditions around, for example obstacles, excavations or traffic.
Precautions:
The person responsible for the product must make all users fully aware of the existing dangers.

⚠ **WARNING**

Inadequate securing of the working site can lead to dangerous situations, for example in traffic, on building sites, and at industrial installations.
Precautions:
Always ensure that the working site is adequately secured. Adhere to the regulations governing safety and accident prevention and road traffic.

⚠ **CAUTION**   If the accessories used with the product are not properly secured and the product is subjected to mechanical shock, for example blows or falling, the product may be damaged or people can sustain injury.
Precautions:
When setting-up the product, make sure that the accessories are correctly adapted, fitted, secured, and locked in position.
Avoid subjecting the product to mechanical stress.

⚠ **WARNING**   If the product is used with accessories, for example masts, staffs, poles, you may increase the risk of being struck by lightning.
Precautions:
Do not use the product in a thunderstorm.

⚠ **DANGER**   If the product is used with accessories, for example on masts, staffs, poles, you may increase the risk of being struck by lightning. Danger from high voltages also exists near power lines. Lightning, voltage peaks, or the touching of power lines can cause damage, injury and death.
Precautions:
• Do not use the product in a thunderstorm as you can increase the risk of being struck by lightning.
• Be sure to remain at a safe distance from electrical installations. Do not use the product directly under or close to power lines. If it is essential to work in such an environment contact the safety authorities responsible for electrical installations and follow their instructions.
• If the product has to be permanently mounted in an exposed location, it is advisable to provide a lightning conductor system. A suggestion on how to design a lightning conductor for the product is given below. Always follow the regulations in force in your country regarding grounding antennas and masts. These installations must be carried out by an authorised specialist.
• To prevent damages due to indirect lightning strikes (voltage spikes) cables, for example for antenna, power source or modem should be protected with appropriate protection elements, like a lightning arrester. These installations must be carried out by an authorised specialist.
• If there is a risk of a thunderstorm, or if the equipment is to remain unused and unattended for a long period, protect your product additionally by unplugging all systems components and disconnecting all connecting cables and supply cables, for example, instrument - antenna.

Air terminal arrangement, plan view
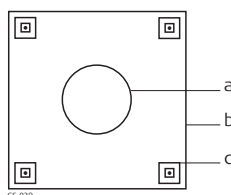
a) Antenna
b) Support structure
c) Air terminal

Grounding the instrument/ antenna
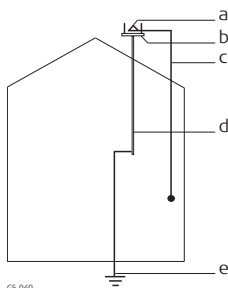
GS_040

a) Antenna
b) Lightning conductor array
c) Antenna/instrument connection
d) Metallic mast
e) Connection to earth

⚠ **CAUTION** During the transport, shipping or disposal of batteries it is possible for inappropriate mechanical influences to constitute a fire hazard.
Precautions:
Before shipping the product or disposing of it, discharge the batteries by running the product until they are flat.
When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping contact your local passenger or freight transport company.

⚠ **WARNING** High mechanical stress, high ambient temperatures or immersion into fluids can cause leakage, fire or explosions of the batteries.
Precautions:
Protect the batteries from mechanical influences and high ambient temperatures. Do not drop or immerse batteries into fluids.

⚠ **WARNING** If battery terminals are short circuited e.g. by coming in contact with jewellery, keys, metalized paper or other metals, the battery can overheat and cause injury or fire, for example by storing or transporting in pockets.
Precautions:
Make sure that the battery terminals do not come into contact with metallic objects.

⚠ **WARNING** Incorrect fastening of the external antenna to vehicles or transporters poses the risk of the equipment being broken by mechanical influence, vibration or airstream. This may result in accident and physical injury.
Precautions:
Attach the external antenna professionally. The external antenna must be secured additionally, for example by use of a safety cord. Ensure that the mounting device is correctly mounted and able to carry the weight of the external antenna (>1 kg) safely.

WARNING If the product is improperly disposed of, the following can happen:
- If polymer parts are burnt, poisonous gases are produced which may impair health.
- If batteries are damaged or are heated strongly, they can explode and cause poisoning, burning, corrosion or environmental contamination.
- By disposing of the product irresponsibly you may enable unauthorised persons to use it in contravention of the regulations, exposing themselves and third parties to the risk of severe injury and rendering the environment liable to contamination.

Precautions:

The product must not be disposed with household waste.
Dispose of the product appropriately in accordance with the national regulations in force in your country.
Always prevent access to the product by unauthorised personnel.

Product-specific treatment and waste management information can be downloaded from the Leica Geosystems home page at http://www.leica-geosystems.com/treatment or received from your Leica Geosystems dealer.

WARNING Only Leica Geosystems authorised service workshops are entitled to repair these products.

8.6 Electromagnetic Compatibility EMC

Description The term Electromagnetic Compatibility is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.

WARNING Electromagnetic radiation can cause disturbances in other equipment.

Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment may be disturbed.

CAUTION There is a risk that disturbances may be caused in other equipment if the product is used with accessories from other manufacturers, for example field computers, personal computers, two-way radios, non-standard cables or external batteries.
Precautions:
Use only the equipment and accessories recommended by Leica Geosystems. When combined with the product, they meet the strict requirements stipulated by the guidelines and standards. When using computers and two-way radios, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

CAUTION Disturbances caused by electromagnetic radiation can result in erroneous measurements.
Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that the product may be disturbed by intense electromagnetic radiation, for example, near radio transmitters, two-way radios or diesel generators.

Precautions:

Check the plausibility of results obtained under these conditions.

⚠ **CAUTION** If the product is operated with connecting cables attached at only one of their two ends, for example external supply cables, interface cables, the permitted level of electromagnetic radiation may be exceeded and the correct functioning of other products may be impaired.

Precautions:

While the product is in use, connecting cables, for example product to external battery, product to computer, must be connected at both ends.

Radios or digital cellular phones

⚠ **WARNING** Use of product with radio or digital cellular phone devices:

Electromagnetic fields can cause disturbances in other equipment, in installations, in medical devices, for example pacemakers or hearing aids and in aircraft. It can also affect humans and animals.

Precautions:

Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment can be disturbed or that humans or animals can be affected.

- Do not operate the product with radio or digital cellular phone devices in the vicinity of filling stations or chemical installations, or in other areas where an explosion hazard exists.
- Do not operate the product with radio or digital cellular phone devices near to medical equipment.
- Do not operate the product with radio or digital cellular phone devices in aircraft.

8.7 FCC Statement, Applicable in U.S.

☞ The greyed paragraph below is only applicable for products without radio.

⚠ **WARNING**
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules.
These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and the receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.

⚠ **WARNING**
Changes or modifications not expressly approved by Leica Geosystems for compliance could void the user's authority to operate the equipment.

Labelling GR10
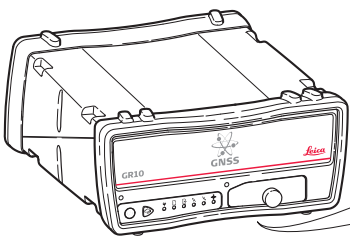
Type : GR10   S.No.: . . . .
Equip.No.: . . . .   Art.No.: . . . . . .
Power: 12-24V ⎓, nominal/2.5A max.
Leica Geosystems AG
CH-9435 Heerbrugg
Manufactured: 2010
Made in Switzerland

CE 0681   25

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
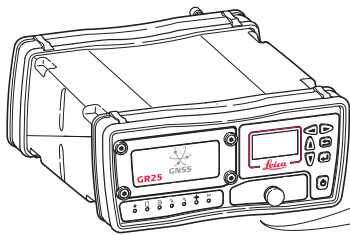
Labelling GR25

Type : GR25   S.No.: . . . .
Equip.No.: . . . .   Art.No.: . . . . . .
Power: 12-24V ⎓, nominal/2.5A max.
Leica Geosystems AG   IC: . . . . . - . . . . .
CH-9435 Heerbrugg   Contains transmitter module:
Manufactured: 2010   FCC-ID: . . . .
Made in Switzerland   Bluetooth QD ID: . . . .
                      . . . .

CE 0681   25

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

9 Technical Data

9.1 GR10/GR25 Technical Data

9.1.1 Tracking Characteristics

Instrument technology SmartTrack+

Satellite reception Multi-frequency, GPS, GLONASS and Galileo

Instrument channels Up to 16 channels continuous tracking on L1, L2 and L5 (GPS); up to 14 channels continuous tracking on L1 and L2 (GLONASS); up to 14 channels continuous tracking on L1, E5a, E5b and Alt-BOC (Galileo); four channels tracking SBAS.

☞ Depending on the satellite systems and signals configured in **Satellite Tracking Settings Tracking** a maximum number of 120 channels is allocated.

Supported codes and phases

GPS

Type	L1	L2	L5
GR10/GR25	Carrier phase, C/A-code	Carrier phase, C code (L2C) and P2-code	Carrier phase, code

GLONASS

Type	L1	L2
GR10/GR25	Carrier phase, C/A-code	Carrier phase, P2-code, C code

Galileo

Type	E1	E5a	E5b	Alt-BOC
GR10/GR25	Carrier phase, code	Carrier phase, code	Carrier phase, code	Carrier phase, code

GPS Carrier tracking

Condition	GR10/GR25
L1, AS off or on	Reconstructed carrier phase via C/A-code.
L2, AS off	Reconstructed carrier phase via P2-code.
L2, AS on	Switches automatically to patented P-code aided technique providing full L2 reconstructed carrier phase.

GPS code measurements

Condition	GR10/GR25
L1, AS off L1, AS on	Carrier phase smoothed code measurements: C/A-code.
L2, AS off	Carrier phase smoothed code measurements: P2-code and/or L2C code.

Condition	GR10/GR25
L2, AS on	Carrier phase smoothed code measurements: Patented P-code aided code and/or L2C code.

☞ Carrier phase and code measurements on L1, L2 and L5 (GPS) are fully independent with AS on or off.

Code and Phase measurement precision (irrespective whether AS off/on)

Condition	GR10/GR25
Carrier phase L1/L2*	0.2mm rms/0.2mm rms.
Code (pseudorange) on L1/L2*	2cm rms/2cm rms.

* L5/E1/E5a/E5b/Alt-BOC values are expected to be like L1. Final values will be determined after initial operational capability (IOC) has been reached.

Satellites tracked
GR10/GR25: Up to 16 simultaneously on L1, L2 and L5 (GPS) + up to 14 simultaneously on L1 and L2 (GLONASS) + up to 14 simultaneously on E1, E5a, E5b and Alt-BOC (Galileo) + up to four SBAS

9.1.2 Accuracy

☞ Accuracy is dependent upon various factors including the number of satellites tracked, constellation geometry, observation time, ephemeris accuracy, ionospheric disturbance, multipath and resolved ambiguities.

The following accuracies, given as **r**oot **m**ean **s**quare, are based on measurements processed using LEICA Geo Office and the Bernese Software.

The use of multiple GNSS systems can increase accuracy by up to 30% relative to GPS only.

Accuracy (rms) single receiver navigation mode

Navigation accuracy 5–10 m rms for each coordinate
Degradation possible due to Selective Availability

Accuracy in differential code mode

The baseline precision of a differential code solution for static and kinematic surveys is 25 cm.

Accuracy in differential phase mode

Accuracy (rms) with Real Time (RTK) with GR10/GR25 plus AS10*

Static (Rapid)		Kinematic	
Horizontal	**Vertical**	**Horizontal**	**Vertical**
5 mm + 0.5 ppm	10 mm + 0.5 ppm	10 mm + 1 ppm	20 mm + 1 ppm

Accuracy (rms) with post processing with GR10/GR25 plus AS10*

Static (Rapid)		Kinematic	
Horizontal	**Vertical**	**Horizontal**	**Vertical**
5 mm + 0.5 ppm	10 mm + 0.5 ppm	10 mm + 1 ppm	20 mm + 1 ppm

Accuracy (rms) with post processing with GR10/GR25 plus AR10/AR25*

Static (Long observation)	
Horizontal	**Vertical**
3 mm + 0.1 ppm	3.5 mm + 0.4 ppm

Note: The above values based on post processing using LEICA Geo Office. Using specialist scientific software (Bernese) available from Leica Geosystems the following accuracies can be achieved is static post processing mode, even on very long baselines:

• 2 - 4 mm in plan   • 3 - 6 mm in height

*Measurement precision, accuracy and reliability are dependent upon various factors including number of satellites, geometry, obstructions, observation time, ephemeris accuracy, ionospheric conditions, multipath etc. Figures quoted assume normal to favorable conditions. Times required are dependent upon various factors including number of satellites, geometry, ionospheric conditions, multipath etc. GPS and GLONASS can increase performance and accuracy by up to 30% relative to GPS only. A full Galileo and GPS L5 constellation will further increase measurement performance and accuracy.

9.1.3 Technical Data

Dimensions

The dimensions are given for the housing without the sockets.

GR10/GR25	Length [cm]	Width [cm]	Thickness [cm]
Without bumpers	21.0	19.0	7.8
With bumpers	22.0	20.0	9.4

Weight

GR10 weight:

Type	Weight [kg]
Without bumpers	1.50
With bumpers	1.67

GR25 weight:

Type	Weight [kg]
Without battery*	1.84
With battery*	2.29

* With bumpers

Recording

Data can be recorded on the SD card.

☞ The figures shown are accurate to 1%. They are dependent on the additional tracking settings configured on the instrument.

4 GB card, GPS (L1+L2+L5), 12 satellites

Rate	MDB only	RINEX only	Hatanaka only
1 s	2180 h 3700 h zipped	450 h 1700 h zipped	1700 h 4500 h zipped
30 s	56550 h 95780 h zipped	12650 h 47380 h zipped	49700 h 108000 h zipped

4 GB card, GPS + GLONASS (L1+L2), 12/10 satellites

Rate	MDB only	RINEX only	Hatanaka only
1 s	1400 h 2400 h zipped	330 h 1240 h zipped	1220 h 3280 h zipped
30 s	38400 h 65000 h zipped	9100 h 34000 h zipped	36400 h 74800 h zipped

4 GB card, GPS + GLONASS + Galileo (L1+E5a+E5b+Altboc), 12/10/10 satellites

Rate	MDB only	RINEX only	Hatanaka only
1 s	840 h 1400 h zipped	185 h 700 h zipped	680 h 1800 h zipped
30 s	23800 h 40300 h zipped	5050 h 19000 h zipped	20400 h 41350 h zipped

Power

24 V Power supply

Condition	Power consumption	
	GR10	**GR25**
Logging at 1 Hz, with only the power supply and antenna connected	3.1 W	3.1 W
Logging and streaming at 1 Hz, with power supply, antenna and ethernet connected	3.5 W	3.3 W

GR10 Power consumption: 3.5 W typically, 24 V@150 mA
GR25 Power consumption: 3.3 W typically, 24 V@140 mA
External supply voltage: Nominal 12 V DC (===, GEV71 car battery cable to a 12 V car battery), voltage range 10.5 V-28 V DC

Battery internal

GR25 only:

Type: Li-Ion
Voltage: 14.8 V
Capacity: GEB241: 4.8 Ah
GEB242: 5.8 Ah

Battery external

Type: NiMH
Voltage: 12 V
Capacity: GEB171: 9.0 Ah

Operating times

Designed for continuous operation.

Environmental specifications

Temperature

Type	Operating temperature [°C]	Storage temperature [°C]
Instrument	-40 to +65	-40 to +80
Leica SD cards	-40 to +85	-40 to +85
Battery internal	-20 to +65	-40 to +70

Protection against water, dust and sand

Type	Protection
Instrument	IP67 (IEC 60529) Dust tight Waterproof to 1 m temporary immersion

Humidity

Type	Protection
Instrument	Up to 100 %
	The effects of condensation are to be effectively counteracted by periodically drying out the instrument.

Connector types

Port	Description
PWR	LEMO-1 female, 5 pin
Serial P1	LEMO-1 female, 8 pin
Serial P2 / Event *	LEMO-1 female, 8 pin
GNSS Antenna	TNC female
P3 Slot-in Antenna	TNC female
Oscillator	MMCX female, 24QMA-50 2-3/133, 5/10 Mhz
Ethernet	RJ45 ruggedised, 10/100Mbit
PPS *	LEMO ERN.OS.250.CTL
USB client	Type Mini B
Bluetooth antenna *	SMA Male
USB host *	Standard Type A

* GR25 only

Power port

Descriptoion	5 pin LEMO supporting dual power inputs
Connector	LEMO-1, 5 pin, LEMO HMG.1B.306.CLNP

Serial ports

Port	Description	Default setting
P1	Baud rates 2400-115200 baud, incl. RTS/CTS	115200/N/8/1/N
P2 (GR25 only)	Baud rates 2400-115200 baud, incl. RTS/CTS	115200/N/8/1/N

Data output

• Raw Data
• Almanac
• Ephemeris
• Position data

USB client port

Support:	USB 2.0
Speed:	Full speed, 12 Mbit/s (1,5 MB/s)

USB host port

GR25 only:

Support:	USB 2.0
Speed:	High speed, 480 Mbit/s (60 MB/s)
Output power:	500 mA (5 V) => Support devices up to 2.5 W

External oscillator input	**External clock input:**	
	Frequency:	5 MHz or 10 MHz
	Input impedance:	50Ω nominal
	Input VSWR:	2:1 maximum
	Signal level:	0 dBm minimum to +13.0 dBm maximum
	Frequency stability:	+0.5 ppm maximum
	Wave shape:	Sinusoidal
	Connector:	MMCX female

☞ Internal Oscillator aligned to GPS time within 10 nanoseconds.
☞ Please remove the External oscillator port cover before connecting the cable.

Ethernet network interface	IEEE Standards:	802.3 10BASE-T Ethernet
		802.3u 100BASE-TX Fast Ethernet
		802.3 Auto-negotiation
	Link Speed:	10/100 Mbps, Half/Full Duplex
	Protocol:	CSMA/CD
	Connector:	Ruggedised RJ45

Bluetooth	Type:	Bluetooth 2.0
	Enhanced Data Rate:	EDR maximum 2.1 Mbits/s
	Connector:	SMA male

9.2 Antennas Technical Data

Description and use

The antenna is selected for use based upon the application. The table gives a description and the intended use of the individual antennas.

Type	Description	Use
AR25	Dorne & Margolin GPS, GLONASS, Galileo, Compass, QZSS antenna element with 3D choke ring ground plane. Optional protective radome.	High end applications. For example, monitoring tectonic plate movements, first order control and reference station applications.
AT504 GG	Dorne & Margolin GPS, GLONASS L1/L2 antenna element with gold anodised choke ring ground plane. Complies with IGS type 'T' antenna, JPL design. Optional protective radome.	High end applications. For example, monitoring tectonic plate movements, first order control and reference station applications.
AR10	GPS, GLONASS, Galileo, Compass, QZSS reference station antenna with large ground plane and built-in radome.	General use for standard and high accuracy reference station and monitoring applications.
AS10	Compact geodetic GPS, GLONASS, Galileo antenna with built-in ground plane.	Standard network RTK and monitoring applications.

Dimensions

Type	AR25	AT504 GG	AR10	AS10
Height	20.0 cm	14.0 cm	14.0 cm	6.2 cm
Diameter	38.0 cm	38.0 cm	24.0 cm	17.0 cm

Connector

AR25:	N-Type female
AT504 GG:	N-Type female
AR10:	TNC female
AS10:	TNC female

Mounting

All antennas: 5/8" Whitworth Thread

Weight	AR25:	8.1 kg, radome 1.1 kg
	AT504 GG:	4.3 kg, radome 1.1 kg
	AR10:	1.1 kg
	AS10:	0.4 kg

Electrical data

Type	AR25	AT504 GG	AR10	AS10
Voltage	3.3 V to 12 V DC	4.5 V to 18 V DC	3.3 V to 12 V DC	4.5 V to 18 V DC
Current	100 mA max	50 mA typical	100 mA maxl	35 mA typical
Frequency				
GPS:	L1, L2 (including L2C), L5.	L1, L2 (including L2C).	L1, L2 (including L2C), L5.	L1, L2 (including L2C), L5.
GLONASS:	L1, L2, L3.	L1, L2.	L1, L2, L3.	L1, L2.
Galileo:	E2-L1-E1, E5a, E5b, E5a+b (Alt-BOC), E6.	-	E2-L1-E1, E5a, E5b, E5a+b (Alt-BOC), E6.	E2-L1-E1, E5a, E5b, E5a+b (Alt-BOC).
Compass:	B1, B2, B3.	-	B1, B2, B3.	B1, B2.
Gain (typically)	40 dBi	29 dBi	29 dBi	27 dBi
Noise Figure (typically)	‹ 1.2 dBi max	3 dBi	‹ 2 dBi	‹ 2 dBi

Environmental specifications

Temperature

Type	Operating temperature [°C]	Storage temperature [°C]
AR25	-55 to +85	-55 to +90
AT504 GG	-40 to +70	-40 to +70
AR10	-40 to +70	-55 to +85
AS10	-40 to +70	-55 to +85

Protection against water, dust and sand

Type	Protection
All antennas	IP67 (IEC 60529)
	Dust tight
	Protected against water jets
	Waterproof to 1 m temporary immersion

Humidity

Type	Protection
All antennas	Up to 100 %
	The effects of condensation are to be effectively counter-acted by periodically drying out the antenna.

Cable length

Instrument	Antenna	Available cable lengths for all antennas [m]
GR10/GR25	All antennas	1.2, 2.8, 10, 30, 50 and 70

9.3 Conformity to National Regulations

9.3.1 GR10

Conformity to national regulations

- FCC Part 15, 22 and 24 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the product GR10 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity can be consulted at http://www.leica-geosystems.com/ce.

  Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EEA member state.

- The conformity for countries with other national regulations not covered by the FCC part 15, 22 and 24 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band

Type	Frequency band [MHz]
GR10	GPS L1: 1575.42 GPS L2: 1227.60 GPS L5: 1176.45 GLONASS L1: 1602.5625-1611.5 GLONASS L2: 1246.4375-1254.3 Galileo E1: 1575.42 Galileo E5a: 1176.45 Galileo E5b: 1207.14 Galileo AltBOC: 1191.795

Output power

Type	Output power [mW]
GNSS	Receive only

Antenna

Type	Antenna	Gain [dBi]	Connector	Frequency band [MHz]
GNSS	External GNSS antenna element (receive only)	-	-	-

9.3.2　GR25

Conformity to national regulations

- FCC Part 15, 22 and 24 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the product GR25 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity can be consulted at http://www.leica-geosystems.com/ce.

  Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EEA member state.
- The conformity for countries with other national regulations not covered by the FCC part 15, 22 and 24 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band

Type	Frequency band [MHz]
GR25	GPS L1: 1575.42 GPS L2: 1227.60 GPS L5: 1176.45 GLONASS L1: 1602.5625-1611.5 GLONASS L2: 1246.4375-1254.3 Galileo E1: 1575.42 Galileo E5a: 1176.45 Galileo E5b: 1207.14 Galileo AltBOC: 1191.795

Output power

Type	Output power [mW]
GNSS	Receive only

Antenna

Type	Antenna	Gain [dBi]	Connector	Frequency band [MHz]
GNSS	External GNSS antenna element (receive only)	-	-	-

9.3.3　　　GFU24, Siemens MC75

Conformity to national regulations

- FCC Part 15, 22 and 24 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the GFU24 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at http://www.leica-geosystems.com/ce.

  Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EEA Member state.
- The conformity for countries with other national regulations not covered by the FCC part 15, 22 and 24 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band　　Quad-Band EGSM850 MHz/ EGSM900 MHz/ GSM1800 MHz/ GSM1900 MHz

Output power

EGSM850/900:	2 W
GSM1800/1900:	1 W

Antenna

Type	GAT3	GAT5	GAT18
Frequency band [MHz]	890 - 960 / 1710 - 1880 / 1920 - 2170	824 - 894 / 1850 - 1990	824 - 894 / 890 - 960 / 1710 - 1880 / 1850 - 1990 / 1920 - 2170
Type	Detachable λ/2 antenna	Detachable λ/2 antenna	Detachable λ/2 antenna
Connector	TNC	TNC	TNC

Specific Absorption Rate (SAR)

The product meets the limits for the maximum permissible exposure of the guide-lines and standards which are force in this respect. The product must be used with the recommended antenna. A separation distance of at least 20 centimetres should be kept between the antenna and the body of the user or nearby person within the intended application.

9.3.4   GFU19 (US), GFU25 (CAN) CDMA MultiTech MTMMC-C

Conformity to national regulations

- FCC Part 15, 22 and 24 (applicable in US)
- The conformity for countries with other national regulations not covered by the FCC part 15, 22 and 24 has to be approved prior to use and operation.

Frequency band   Dual-Band CDMA850 MHz/CDMA1900 MHz

Output power

CDMA850:   2 W
CDMA1900:   0.4 W

Antenna

Type	GAT5	GAT18
Frequency band [MHz]	824 - 894 / 1850 -1990	824 - 894 / 890 - 960 / 1710 - 1880 / 1850 - 1990 / 1920 - 2170
Type	Detachable λ/2 antenna	Detachable λ/2 antenna
Connector	TNC	TNC

Specific Absorption Rate (SAR)

The product meets the limits for the maximum permissible exposure of the guide-lines and standards which are force in this respect. The product must be used with the recommended antenna. A separation distance of at least 20 centimetres should be kept between the antenna and the body of the user or nearby person within the intended application.

9.3.5 SLG1-2, Telit 3G GSM/GPRS/UMTS

Conformity to national regulations

- FCC Part 15, 22 and 24 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the SLG1-2 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at http://www.leica-geosystems.com/ce.

  $C\epsilon$ Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EEA Member state.
- The conformity for countries with other national regulations not covered by the FCC part 15, 22 and 24 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band

UMTS/HSDPA (WCDMA/FDD) 850 MHz/ 1900 MHz/ 2100 MHz
Quad-Band EGSM 850 MHz/ 900 MHz/ 1800 MHz/ 1900 MHz
GPRS multi-slot class 12
EDGE multi-slot class 12

Output power

EGSM850/900:	2 W
GSM1800/1900:	1 W
UMTS2100:	0.25 W
EDGE850/900:	0.5 W
EDGE1800/1900:	0.4 W

Antenna

Type	Internal	GAT3	GAT5	GAT18
Frequency band [MHz]	824 - 894 / 890 - 960 / 1710 - 1880 / 1850 - 1990 / 1920 - 2170	890 - 960 / 1710 - 1880 / 1920 - 2170	824 - 894 / 1850 - 1990	824 - 894 / 890 - 960 / 1710 - 1880 / 1850 - 1990 / 1920 - 2170
Type	Internal	Detachable $\lambda/2$ antenna	Detachable $\lambda/2$ antenna	Detachable $\lambda/2$ antenna
Connector	-	TNC	TNC	TNC

Specific Absorption Rate (SAR)

The product meets the limits for the maximum permissible exposure of the guide-lines and standards which are force in this respect. The product must be used with the recommended antenna. A separation distance of at least 20 centimetres should be kept between the antenna and the body of the user or nearby person within the intended application.

9.3.6 SLG2-2, CINTERION MC75i

Conformity to national regulations

- FCC Part 15, 22 and 24 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the SLG2-2 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at http://www.leica-geosystems.com/ce.

  Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EEA Member state.
- The conformity for countries with other national regulations not covered by the FCC part 15, 22 and 24 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band

Quad-Band EGSM850 MHz/ EGSM900 MHz/ GSM1800 MHz/ GSM1900 MHz

Output power

EGSM850/900:	2 W
GSM1800/1900:	1 W

Antenna

Type	Internal	GAT3	GAT5	GAT18
Frequency band [MHz]	824 - 894 / 890 - 960 / 1710 - 1880 / 1850 - 1990 / 1920 - 2170	890 - 960 / 1710 - 1880 / 1920 - 2170	824 - 894 / 1850 - 1990	824 - 894 / 890 - 960 / 1710 - 1880 / 1850 - 1990 / 1920 - 2170
Type	Internal	Detachable $\lambda/2$ antenna	Detachable $\lambda/2$ antenna	Detachable $\lambda/2$ antenna
Connector	-	TNC	TNC	TNC

Specific Absorption Rate (SAR)

The product meets the limits for the maximum permissible exposure of the guide-lines and standards which are force in this respect. The product must be used with the recommended antenna. A separation distance of at least 20 centimetres should be kept between the antenna and the body of the user or nearby person within the intended application.

9.3.7 SLR1-2, SATEL SATELLINE-TA11

Conformity to national regulations

- FCC Part 15 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the product SLR1-2 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity can be consulted at http://www.leica-geosystems.com/ce.

Class 2 equipment according European Directive 1999/5/EC (R&TTE) for which following EEA Member States apply restrictions on the placing on the market or on the putting into service or require authorisation for use:
  - France
  - Italy
  - Norway (if used in the geographical area within a radius of 20km from the centre of Ny-Ålesund)

- The conformity for countries with other national regulations not covered by the FCC part 15 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band

403 MHz - 470 MHz

Output power

SLR1-2:   0.5 W-1.0 W

Antenna

Type	Internal	GAT1	GAT2
Frequency band [MHz]	400 - 470	400 - 435	435 - 470
Type	Internal	Detachable λ/2 antenna	Detachable λ/2 antenna
Connector	-	TNC	TNC

Specific Absorption Rate (SAR)

The product meets the limits for the maximum permissible exposure of the guide-lines and standards which are force in this respect. The product must be used with the recommended antenna. A separation distance of at least 20 centimetres should be kept between the antenna and the body of the user or nearby person within the intended application.

9.3.8 SLR5-1, SATEL SATELLINE M3-TR1

Conformity to national regulations

- FCC Part 15 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the product SLR5-1 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity can be consulted at http://www.leica-geosystems.com/ce.

  Class 2 equipment according European Directive 1999/5/EC (R&TTE) for which following EEA Member States apply restrictions on the placing on the market or on the putting into service or require authorisation for use:
  - France
  - Italy
  - Norway (if used in the geographical area within a radius of 20km from the centre of Ny-Ålesund)
- The conformity for countries with other national regulations not covered by the FCC part 15 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band   403 MHz - 470 MHz

Output power   SLR5-1:   0.5 W-1.0 W

Antenna

Type	GAT1	GAT2
Frequency band [MHz]	400 - 435	435 - 470
Type	Detachable λ/2 antenna	Detachable λ/2 antenna
Connector	TNC	TNC

Specific Absorption Rate (SAR)

The product meets the limits for the maximum permissible exposure of the guide-lines and standards which are force in this respect. The product must be used with the recommended antenna. A separation distance of at least 20 centimetres should be kept between the antenna and the body of the user or nearby person within the intended application.

10 International Limited Warranty, Software Licence Agreement

Software Licence Agreement

This product contains software that is preinstalled on the product, or that is supplied to you on a data carrier medium, or that can be downloaded by you online according to prior authorisation from Leica Geosystems. Such software is protected by copyright and other laws and its use is defined and regulated by the Leica Geosystems Software Licence Agreement, which covers aspects such as, but not limited to, Scope of the Licence, Warranty, Intellectual Property Rights, Limitation of Liability, Exclusion of other Assurances, Governing Law and Place of Jurisdiction. Please make sure, that at any time you fully comply with the terms and conditions of the Leica Geosystems Software Licence Agreement.

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Appendix A   Directory Structure of the Memory Device

Directory structure (SD card)

```
|—— DATA                   Storing raw data logging data
|    |—— Session1*
|    |—— Session2*
|    |—— Session3*
|—— Transfer               Upload and download files
|    |—— Antenna           Upload antenna files
|    |—— Firmware          Upload firmware files
|    |—— Options           Upload option files
|    |—— Language          Upload language files
|    |—— Settings          Upload system configuration
```

Directory structure (via FTP access)

When accessing the GR10/GR25 via FTP, the folder structure is as follows:

```
|—— SD Card
|    |—— DATA              Storing raw data logging data
|    |    |—— Session1*
|    |    |—— Session2*
|    |    |—— Session3*
|    |—— Transfer          Upload and download files
|    |    |—— Antenna      Upload antenna files
|    |    |—— Firmware     Upload firmware files
|    |    |—— Options      Upload option files
|    |    |—— Language     Upload language files
|    |    |—— Settings     Upload system configuration
```

Directory structure (USB Disks)

```
|—— USB Disks**
|    |—— DATA              Storing raw data logging data
|    |    |—— Session1*
|    |    |—— Session2*
|    |    |—— Session3*
|    |—— Transfer          Upload and download files
|    |    |—— Antenna      Upload antenna files
|    |    |—— Firmware     Upload firmware files
|    |    |—— Options      Upload option files
|    |    |—— Language     Upload language files
|    |    |—— Settings     Upload system configuration
```

* The name of the directory shown will be the configured Logging session name. For example an MDB, RINEX or Hatanaka raw data logging session. Refer to the "GR Series Operational Manual (Online Help)" for further information.

**For GR25 only
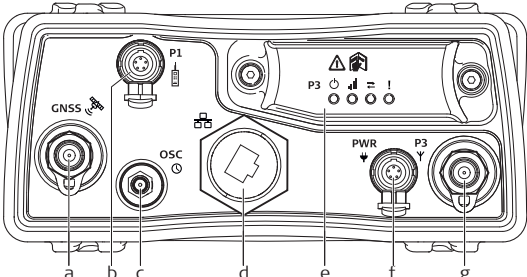
Appendix B Pin Assignments and Sockets

B.1 GR10

Description

Some applications require knowledge of the pin assignments for the GR10 ports. In this chapter, the pin assignments and sockets for the ports of the GR10 are explained.

Ports on the instrument rear panel

a) **GNSS:** GNSS Antenna port TNC
b) **P1:** Serial port, 8 pin LEMO
c) **OSC:** Oscillator port
d) **Ethernet port:** Ruggedised RJ45

e) **P3:** Communication Slot-in port
f) **PWR:** Power port, 5 pin LEMO, dual input
g) **P3:** Communication Slot-in port Antenna, TNC

Pin assignments for P1: Serial Port

Pin	Signal Name	Function	Direction
1	RTS	RS232, ready to send	Out
2	CTS	RS232, clear to send	In
3	GND	Signal ground	-
4	RxD	RS232, receive data	In
5	TxD	RS232, transmit data	Out
6	ID	Indentification pin	In or out
7	GPIO	RS232, configurable function	In or out
8	+12 V	12 V power supply out	Out

Pin assignments for PWR: Power port

Pin	Signal Name	Function	Direction
1	PWR1	Power input, 10.5 V-28 V	In
2	ID1	Identification pin	In
3	GND	Signal ground	-
4	PWR2	Power input, 10.5 V-28 V	In
5	ID2	Identification pin	In

Sockets

Port P1:   LEMO-1, 8 pin, LEMO EGI.1B.308.CLN
Port PWR: LEMO-1, 5 pin, LEMO HMG.1B.305.CLNP

B.2　　　GR25

Description

Some applications require knowledge of the pin assignments for the GR25 ports. In this chapter, the pin assignments and sockets for the ports of the GR25 are explained.

Ports on the instrument rear panel

GR25_006
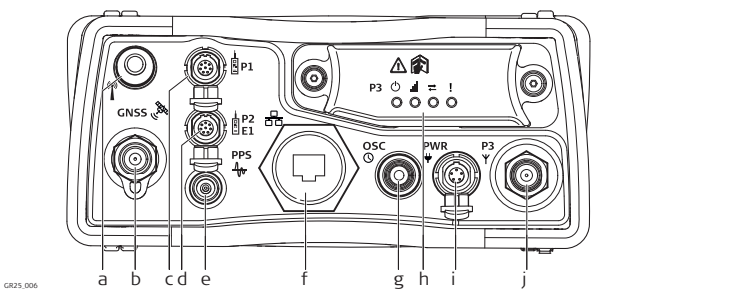
a) **Bluetooth:** BT Antenna
b) **GNSS:** GNSS Antenna port TNC
c) **P1:** Serial port, 8 pin LEMO
d) **P2:** Serial/Event port, 8 pin LEMO
e) **PPS:** Pulse per second output
f) **Ethernet port:** Ruggedised RJ45

g) **OSC:** Oscillator port
h) **P3:** Communication Slot-in port
i) **PWR:** Power port, 5 pin LEMO, dual input
j) **P3:** Communication Slot-in port Antenna, TNC

Pin assignments for P1: Serial Port

PIN_003

Pin	Signal Name	Function	Direction
1	RTS	RS232, ready to send	Out
2	CTS	RS232, clear to send	In
3	GND	Signal ground	-
4	RxD	RS232, receive data	In
5	TxD	RS232, transmit data	Out
6	ID	Indentification pin	In or out
7	GPIO	RS232, configurable function	In or out
8	+12 V	12 V power supply out	Out

Pin assignments for P2: Serial Port

PIN_003

Pin	Signal Name	Function	Direction
1	RTS	RS232, ready to send	Out
2	CTS	RS232, clear to send	In
3	GND	Signal ground	-
4	RxD	RS232, receive data	In
5	TxD	RS232, transmit data	Out
6	ID	Indentification pin	In or out
7	GPIO / EVT IN	RS232, general purpose input/output	In or out
8	+12 V	12 V power supply out	Out

Pin assignments for PWR: Power port
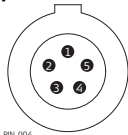
PIN_004

Pin	Signal Name	Function	Direction
1	PWR1	Power input, 10.5 V-28 V	In
2	ID1	Identification pin	In
3	GND	Signal ground	-
4	PWR2	Power input, 10.5 V-28 V	In
5	ID2	Identification pin	In

Sockets

Port P1:	LEMO-1, 8 pin, LEMO EGI.1B.308.CLN
Port P2:	LEMO-1, 8 pin, LEMO EGI.1B.308.CLN
Port PWR:	LEMO-1, 5 pin, LEMO HMG.1B.305.CLNP
PPS:	LEMO REN.OS.250.CTL
OSC:	MMCX female - 24QMA-50-2-3/133

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- when it has to be **right**